

CTO

APRIL 15, 1994
VOLUME SEVEN NUMBER THIRTEEN
SEVEN DOLLARS

THE MAGAZINE FOR INFORMATION EXECUTIVES

COVER STORY

How Imaging Tames The Paper Tiger

ALSO INSIDE

*Why Are Advanced
Technology Groups
Suddenly Coming
Down To Earth?*

AN INTERNATIONAL DATA GROUP PUBLICATION

Little Tikes Co.'s
Sharon Petrella



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VOLUME 7, NUMBER 13

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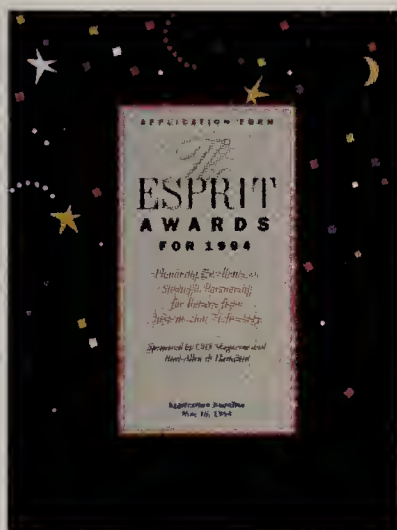
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The Paperless Office Revisited

Electronic document imaging is supporting a renewed push in many companies to do away with paper. But today, the emphasis is less on cutting costs and more on improving the effectiveness of the organization.

By David H. Freedman



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*A spruced-up image 42
Cover photo by Roger Mastroianni*

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Into Africa

As Synetics Corp. battles it out with a French competitor for the hearts and minds of West Africa's port managers, the lesson becomes clear: Americans doing business on this continent have much to learn. *By Thomas Kiely*

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Down to Earth

Advanced-technology groups used to keep their heads very high in the clouds and their operational profiles very low to the ground. These days, however, they're no longer merely big thinkers scoping blue-sky IT directions for the long-term future. Instead, increasing pressure is being applied upon ever-more-visible ATGs to deliver strategic technology today. *By Megan Santosus*

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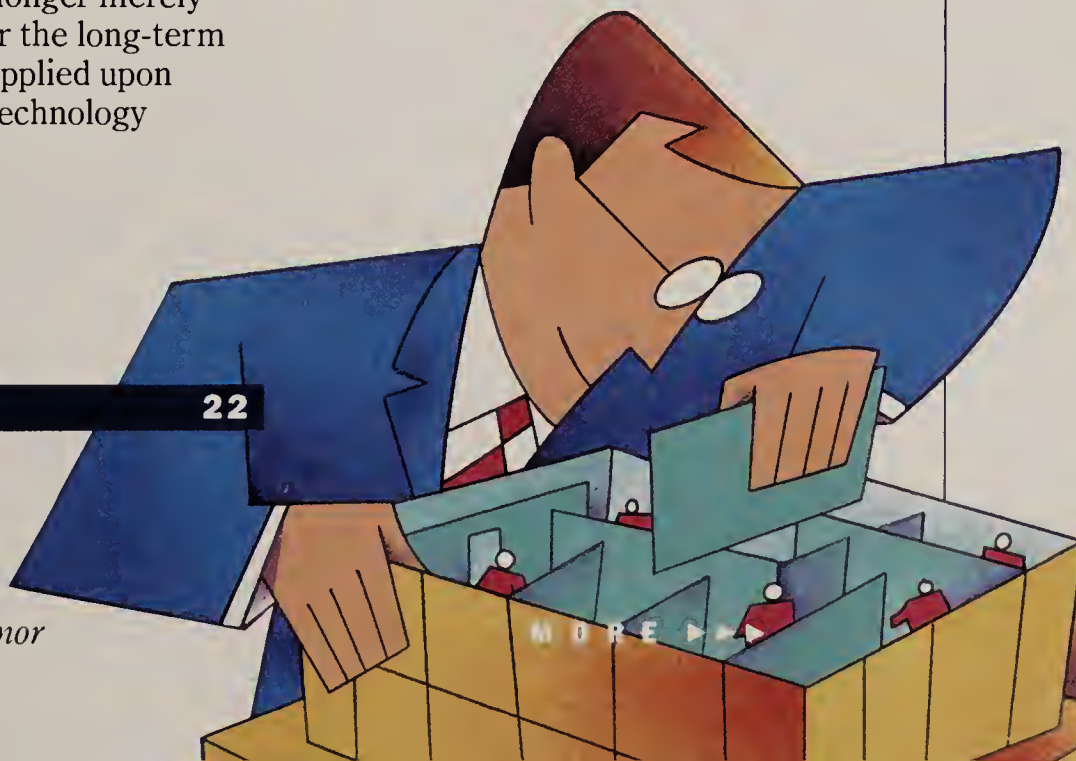
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CIOs are in a unique position to advance their companies' continuous-improvement efforts, if they can only stop defending their own turf. *By Thomas J. Barker and Michael E. Raynor*

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FIRST PERSON: STEP BY STEP

Big projects require lots of executive commitment, coordination between business and IS, and buy-in from users. Kodak's Office Imaging division pulled off a massive sales-automation project by taking a methodical approach and keeping users' needs up front.

By Peter Sparzo

PERSONAL COMMUNICATORS

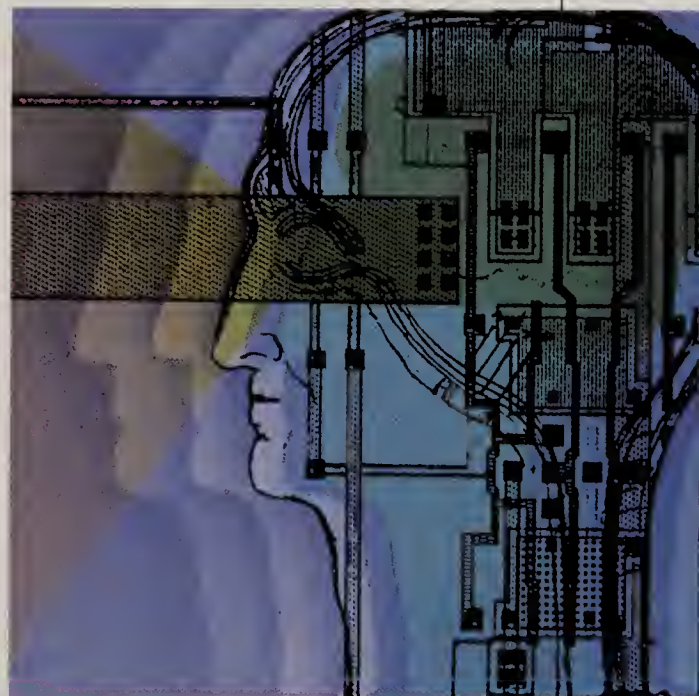
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From multinational corporations to off-track betting parlors, neural networks are alive and thinking.

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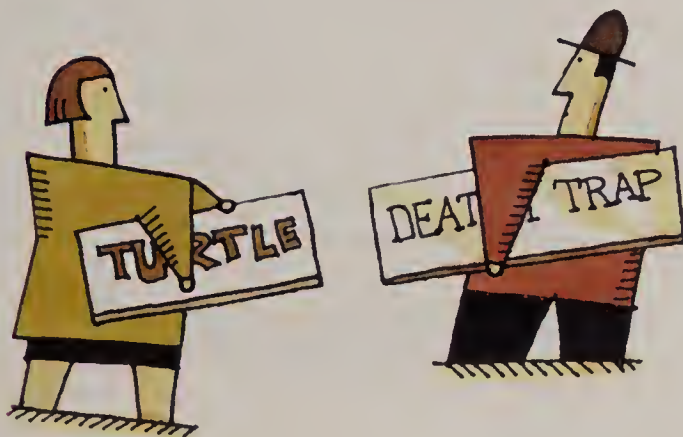
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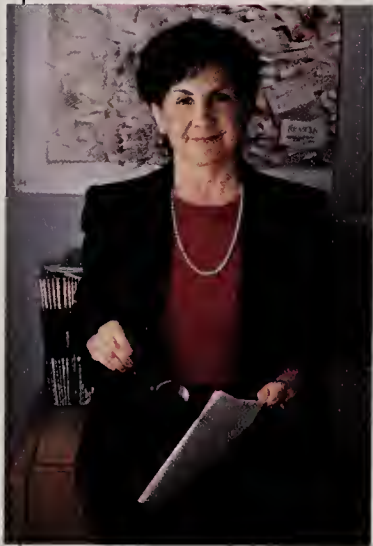
WORKING SMART: A TEXAS LOAN STAR

Texas Commerce Bancshares transformed its poky loan-approval process into an industry model.

By Anne Stuart



What's in
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For many years, international issues were on the back burner in the minds of information executives. Today, global competition is turning up the heat on corporate agendas and fueling important decisions on how IT can aid in international expansion.

Corroborating this view, in its 1993 annual survey of critical issues for CIOs, Deloitte & Touche's Information Technology Consulting Group saw a hefty concern for integrating international operations within the corporate infrastructure, the first time this response appeared on its survey. (Watch for a report on this survey in your next issue of *CIO*.)

This issue of *CIO* includes an intriguing if extreme example of global trade. The conclusion of our two-part story on how U.S.-based systems integrator Synetics Corp. created a port system for the West African nation of Gabon highlights the importance IT plays in less-developed nations and reports how European and American competitors view the international market. Of late, Gabon has been saddled with political unrest (a photographer employed by *CIO* had to be escorted by military police while on assignment there), but that's not stopping technological progress. Gabon's evolving port system is based on client/server technology, and there is talk of using Lotus Notes. Please see "Into Africa," beginning on Page 32.

Adding to this worldwide mandate, Bobby Martin, formerly CIO at Wal-Mart, who now heads up Wal-Mart International, has noted that organizations in emerging markets are looking for help from companies with a wide range of business expertise, and information technology plays a tremendous role in providing that expertise. At the same time, companies in developed countries are increasingly operating in saturated marketplaces and need to find new outlets for their firms.

In recent conversations with *CIO*, several European information executives whose companies compete globally emphasized the need for companies to develop a trading perspective that considers both pan-European and worldwide issues.

Today, companies are concerned with creating an international competitive atmosphere that allows their lines of business to have local autonomy without having to reinvent the information-management platform at each location. In short, creating a worldwide IT infrastructure is bound to be a hot topic on many CIOs' agendas in the next few years.

As a thought leader in the IT forum, *CIO* will be reporting on how companies are managing global competition.

Marcia Blumenthal

PHOTO BY WEBB CHAPPELL



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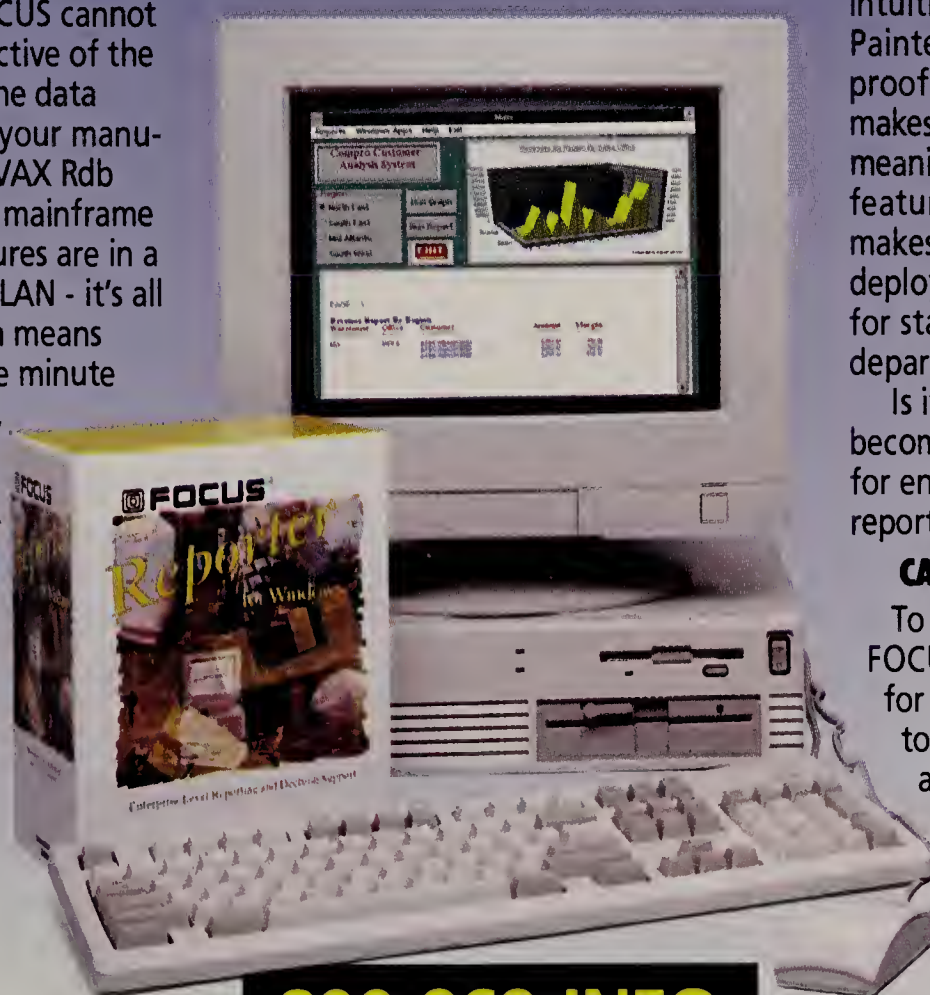
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Information Builders



The role of advanced-technology groups (ATGs) is changing dramatically from that of IT "think tank" to business-savvy change agent (see story on Page 54). This shift appears to be fueled by three key business trends: increasing competitive pressures, the dizzying pace of technology change and top management's mandate that technology be deployed for business value.

As more chief information officers replace "ivory tower" R&D groups with action-oriented ATGs, project prototypes based on myriad advanced technologies are sprouting up with increasing rapidity. Successful new-age ATGs are aligning themselves with in-

ternal customers to understand business requirements. They also know that to prove their value, they must continually demonstrate both technical know-how and business acumen.

Given the ATG's significant influence on technology choices, IT vendors need to understand the specific responsibilities of this group within their client and prospect companies. What business challenges are they grappling with? What types of products fall under the "advanced technologies" umbrella? What is the process for assessing and selecting new technologies for project prototypes?

By knowing the answers to these and other key questions related to advanced-technology deployment, and by making the ATG—and the CIO—a critical marketing target, IT vendors can shorten the sales cycle for their products and services, particularly products that may be perceived by these decision makers as "brave new world" rather than "ready for deployment."

Wayne L. Woz

P.S. Please mark your calendar for the next CIO Perspectives conference, "IT Economics: Business Value & Profit Maximization," to be held Oct. 23-26 at La Paloma in Tucson, Ariz. For more information, call us toll free at 800 366-0246.

Coming In CIO

Time Is Money

Many companies are exploring new ways to use time as a competitive weapon. But the top finishers in the race to market don't just run faster; they run better—while remaining poised to switch directions and take on new opportunities. For IT, the challenge is developing systems that help make contenders not only swift but flexible.

Patents Pending

Software vendors have thrown a lot of angry criticism in the direction of the U.S. Patent and Trademark Office for failing to protect their investments. Despite all the ruckus from vendors, however, little attention has been paid to how patents affect the companies for which IS is a critical operational tool. But make no mistake: If your company buys, develops or uses software, the patent system can touch you in significant ways.

Sales Pitch

In this day of cutthroat competition and fleeting customer loyalty, a traditional approach to sales automation may not be enough. Some say the same reengineering concepts used for manufacturing must be applied to sales and marketing in order to create a sustainable competitive advantage. The idea is to harness technology to create processes that put the customer—not the sales rep—first.

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TRENDLINES

ELECTRONIC MARKETING

COLLEGE DAZE

Applying to colleges is an experience few remember fondly, and these days it's no picnic for the in-

stitutions, either. Faced with declining enrollment and increasing competition, some colleges and universities are looking to IT for help in marketing themselves to a diminished pool of potential students.

Traditionally, high-school students have waded through fat, often overwhelming college guides in

order to select a school. Frequently, "students would just look at schools they were familiar with," never considering the many other possibilities, says Michael Conner, director of marketing for CollegeView, a Cincinnati firm whose name-



sake product targets this problem. And since the number of seniors graduating nationwide is down about 11 percent since 1987 and 23 percent since 1977, Conner says, colleges may find it is no longer enough to rely on this cumbersome method.

CollegeView, a CD-ROM database being tested in about 100 U.S. high schools, helps colleges and universities reach the right students directly. The \$695 database provides information about 1,600 four-year institutions. Students apply their own criteria to customize a search; for example, a senior planning to major in business management and looking for a small, private school in Ohio with a ballroom-dancing club would be presented with a list of appropriate institutions.

Standard, text-based information is included at no charge to the colleges; they can also pay up to \$25,000 to include multimedia presentations on the CD-ROM. Students can then take a video tour of the campus, for example, and hear faculty talk about it. This enhanced package includes an E-mail link so that students can request more information with the click of a button.

For high-school students with access to the Internet,

CHEATERS NEVER PROSPER

Republicans have frequently brandished the epithet "Taxachusetts" as a pejorative weapon against that traditionally liberal New England state. Now the term has assumed new significance as Massachusetts turns to computer technology in a stepped-up war against tax scofflaws.

As part of a departmental overhaul, the Massachusetts Department of Revenue has developed a mainframe-based system that automates the process of collecting back taxes. The system identifies tax delinquents by matching the department's liability files against a file of all people employed in the state. (Massachusetts employers are required to submit a list of their employees in quarterly reports.) The system then automatically generates letters to individuals and their employers requesting payment. If individuals

do not respond within 30 days, the system garnishes the money owed from their earnings—up to 25 percent of their net wages.

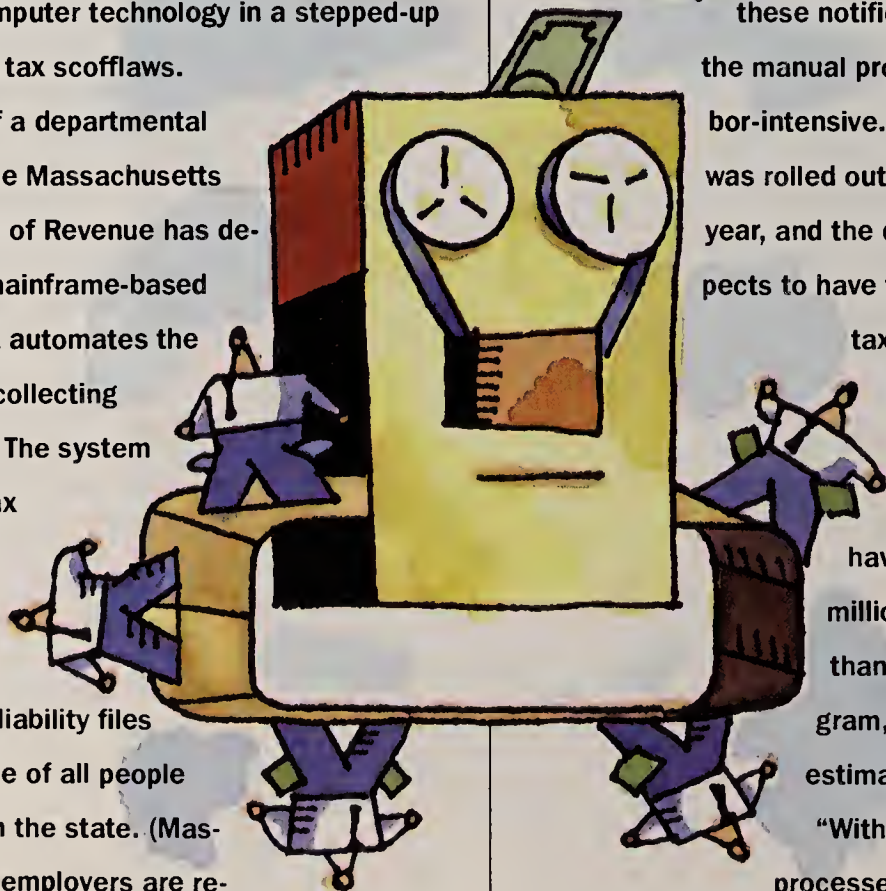


In 1993 only about 700 employers received

these notifications because the manual process was so labor-intensive. The new system was rolled out in January of this year, and the department expects to have targeted 20,000

tax delinquents by the end of this month. Moreover, by June it will have collected \$15 million in back taxes thanks to the new program, the department estimates.

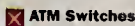
"With this system we processed 810 [tax delinquents] in the first week of the program," says Kevin Sowyrda, a revenue department spokesman. "It's the most efficient, high-technology-gearred program of its kind."



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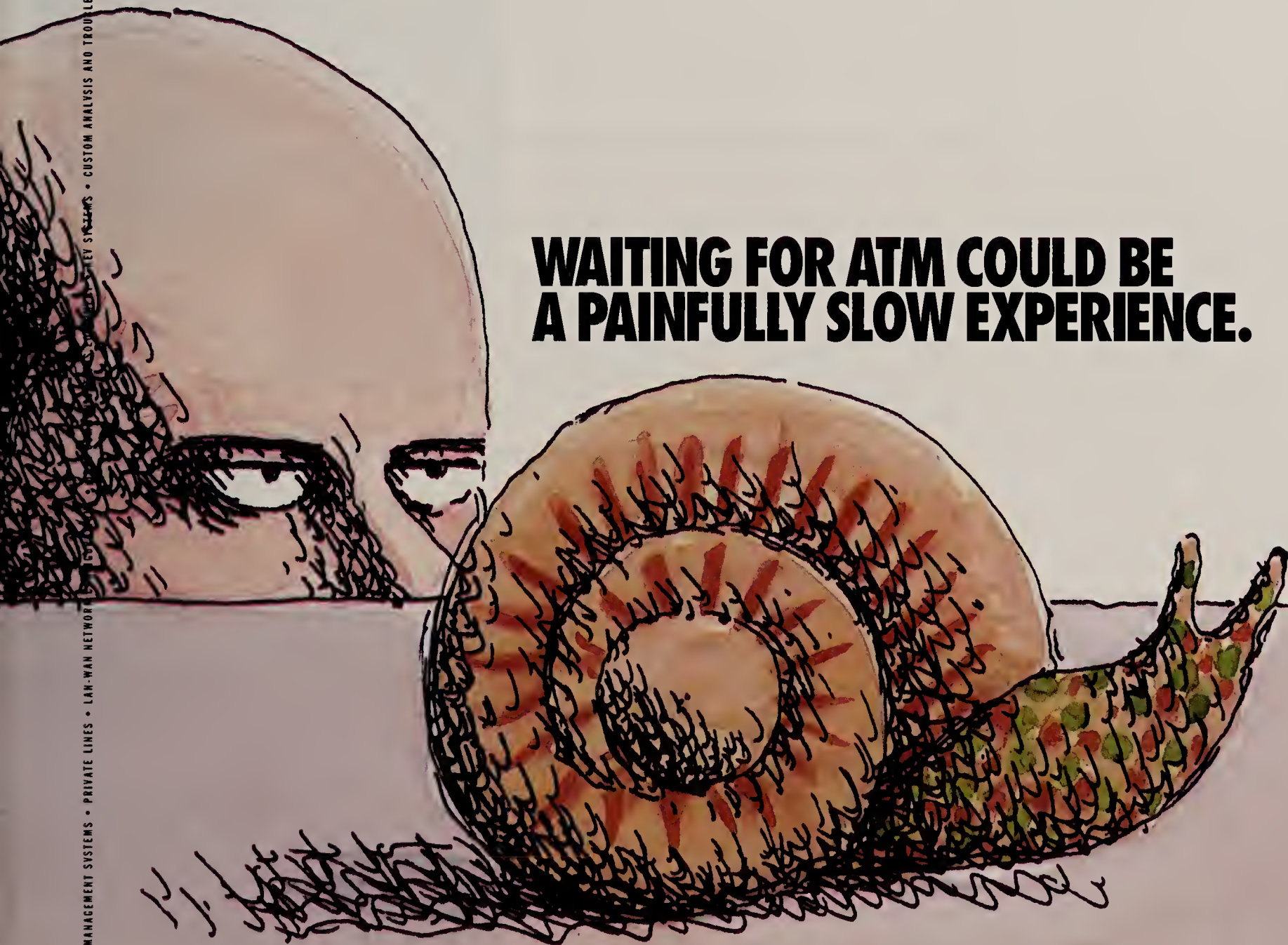
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TRENDLINES

there is another option.

Most major universities have implemented campuswide information systems, which can offer course and library catalogs, campus photographs and movies demonstrating faculty research online, according to Richard Wiggins, the campuswide information systems coordinator at Michigan State University in East Lansing. Using the Internet, either at school or from home, high-school students can access these systems and view information of interest to them—learning about the school in the process.

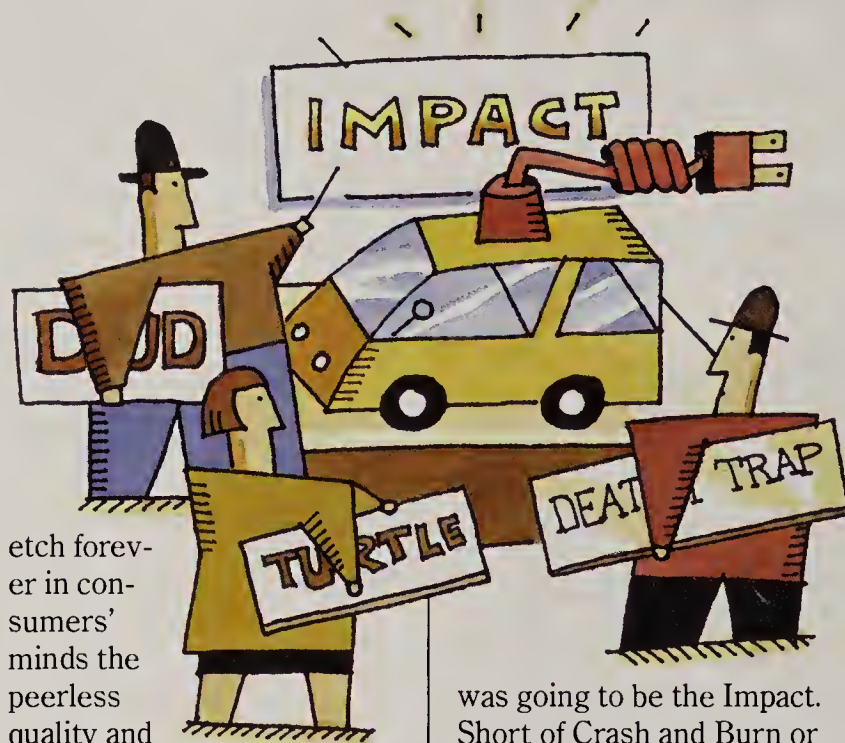
The ability to navigate the network and view videos or other nontext information depends upon the student's expertise and connection. Even if students are not equipped to view such items as videos online, Wiggins says, there is still a wealth of text-based information out there.

And high-school students aren't the only ones who benefit. The admissions office at Michigan State has also encouraged foreign undergraduates—including some from China—to explore the university's graduate programs via the Internet. ■

THE MOST DANGEROUS NAME

Some product names say it all. The Jaguar. The PowerBook. The Ruffles potato chip.

Companies devote tremendous amounts of thought, time and money to finding the perfect monikers for their creations. They—or their advertising agencies—search for the ideal word that will



etch forever in consumers' minds the peerless quality and irreproducible features of their offerings. So we were somewhat surprised when General Motors Corp. announced that the name of its mass-market electric car

was going to be the Impact. Short of Crash and Burn or No Survivors, we couldn't think of a less-propitious appellation for a vehicle.

Recently, however, an explanation presented itself. A *New York Times* article suggested that GM actually

hopes the Impact will flop. If the public refuses to shell out big bucks for a car that must be recharged every 100 miles, the argument goes, then California lawmakers may abandon their requirement that car manufacturers produce a certain percentage of zero-emission vehicles by late 1997.

Under these circumstances, the choice of Impact as a name becomes a stroke of sheer genius. GM can do itself an even bigger favor by releasing the Impact in only one color: yellow. ■

ON THE RECORD

In a recent *New York Times* column, Jim Manzi, chairman and CEO of Lotus Development Corp., of Cambridge, Mass., described how U.S. companies are adopting the Japanese concept of keiretsu—the system of intercompany cooperation—and making it their own. Manzi calls the American version of this much-admired management technique “electronic keiretsu,” in which companies are linked by communications software and groupware.

“America's new keiretsu are not like the Japanese version,” Manzi writes. “But the effect is the same. Electronic keiretsu allow members to pool resources and coordinate efficiently—just as interlocking directorates and formal customer-supplier agreements for the original keiretsu in Japan.

“Ironically, though, no American executive ever intended to design an electronic keiretsu. The enabling technologies—computer networks, electronic mail, relational and document databases, and mobile com-

CAREER MOVES

At Levi Strauss North America, **JOSEPH K. JOHNSON** was appointed director of computing and communications services. He will manage the company's information services center and its move to Dallas from San Francisco. Johnson was most recently employed by EDS Corp.

Times Mirror recently named **MICHAEL LIEBHOLD** vice president of technology. Liebhold, previously with Apple Computer Inc. as a senior scientist in media architectures research, will be responsible for guiding the company's technological strategies.

Gage Marketing Group recently announced that **JOHN UPGREN** was appointed to the position of chief information officer and vice president of information technology. Upgren is responsible for technology strategy and represents the company on technology issues.

JOHN W. WHITE, president of Texas Instruments' information technology business, retired recently to pursue other interests and opportunities. White had been in that position since 1989. ■

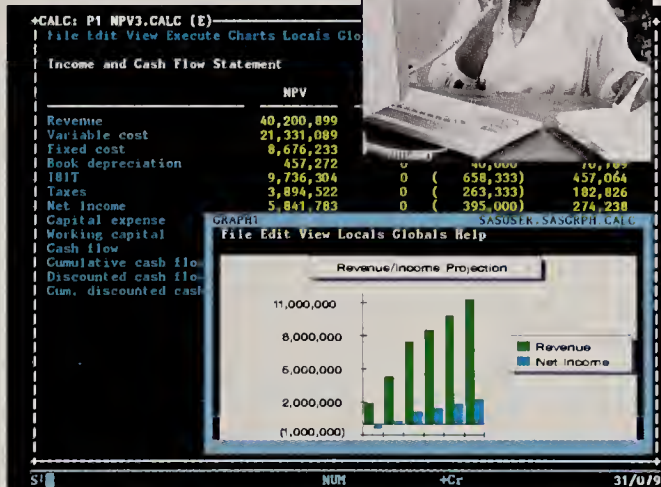
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Than There Are
of You...**

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les Projections



Financial Analysis/Reporting



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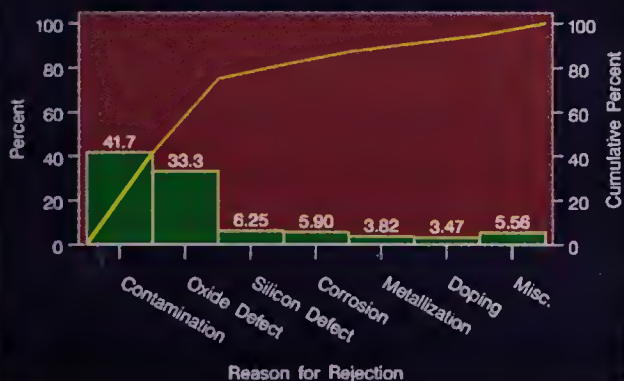


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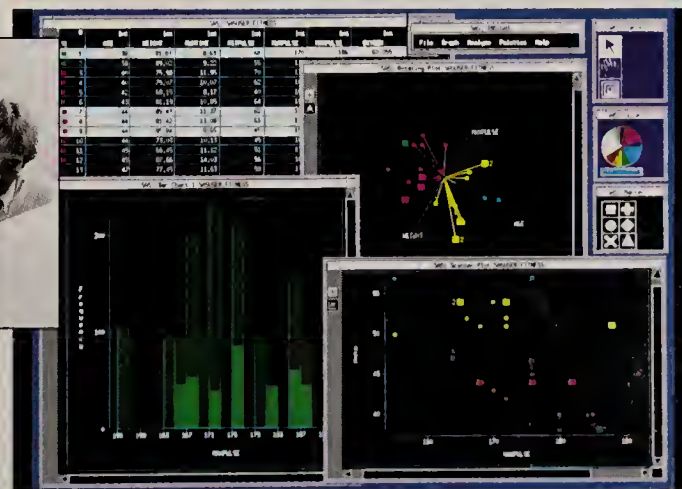
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Problems in IC Manufacturing



Data Visualization



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Fred was great.
Ginger was great.
Together they
were spectacular.

The partnership makes it work!

Fred Astaire certainly held his own. But when he paired up with Ginger Rogers, it was pure magic. The same holds true in business. When two diverse business departments forge alliances, the results are often nothing less than brilliant.

That's the idea behind the ESPRIT (*Excellence in Strategic Partnering for Return from Information Technology*) Awards Program. The ESPRIT Awards recognize the strategic partnership between IS management and business management as they apply IT to improve business value and increase profits. Since its inception in 1993, this program has recognized a select group of companies, government agencies and nonprofit organizations that are using IT to attain real business value in measurable ways.

If you can demonstrate the strategic value and increased bottom-line profits as a result of a technology investment, we want to hear about it. We urge you to participate by filling out the ESPRIT Awards application form bound in this issue of *CIO*. If the entry form has been removed, please call Brooke Burton at (508) 935-4449.

ESPRIT Awards sponsored by



THE MAGAZINE FOR INFORMATION EXECUTIVES

and

BOOZ ALLEN & HAMILTON



APPLICATION FORM

The
ESPRIT
A W A R D S
F O R 1 9 9 4

*Honoring Excellence in
Strategic Partnering
for Return from
Information Technology*

*Sponsored by CIO Magazine and
Booz-Allen & Hamilton*

Application Deadline
May 16, 1994

With ESPRIT, partnership takes on a whole new meaning

part·ner·ship (pärt' nər-ship') *n* 1. The state of being a partner; an association of partners. 2. A contract entered into by two or more persons in which each agrees to furnish a part of the capital and labor for a business enterprise, and by which each shares in some fixed proportion of profits and losses.

—*The American Heritage Dictionary*

If there is one word that defines the ESPRIT Awards it's "*partnership*." This program honors those business and technology executives who have joined forces to plan the acquisition of information technology, implement it and quantify its strategic business value in both hard-dollar and soft benefits.

Recognizing Strategic Partnering

CIO and Booz·Allen & Hamilton created the ESPRIT Awards to recognize this spirit of cooperation as well as the ability to prove a positive and sustained impact on the bottom line from strategic IT investments. By communicating the payback of your technology solution, *CIO* and Booz·Allen & Hamilton hope to encourage other businesses to follow your lead.

Obtaining Real Business Value

What business goals have you achieved with your technology solution? Lowered costs? Raised profits? Increased market share? Enhanced image? The list is endless. There are both hard-dollar and soft benefits that come with IT investments. If you and your business partner can provide

tangible facts and figures about return on investment from information technology, we urge you to participate in the ESPRIT Awards program.

Our Challenge To You

If your technology investment is paying off, we want to hear about it. To participate, simply fill out this ESPRIT Awards application. The January 15, 1995 issue of *CIO* will feature profiles of companies, government agencies and nonprofit organizations that successfully document how their partnered IT investments have increased business value.

Then in early 1995, *CIO* and Booz·Allen & Hamilton will host a special awards ceremony honoring these winning organizations.

For additional information, please contact Brooke Burton at (508) 935-4449.

ESPRIT Awards Timeline

Applications Due:

May 16, 1994

Judges Select

Winners:

September 1994

Announcement of

Winners:

January 1995

Awards Ceremony:

Winter 1995

The 1994 ESPRIT AWARDS

Honoring Excellence in Strategic Partnering for Return from Information Technology

Sponsored by CIO Magazine and Booz·Allen & Hamilton

S**TATEMENT OF PURPOSE**
While most executives are aware of the potential benefits of information technology (IT), some remain unsure of its actual value to their organizations. In order to demonstrate how strategic IT investments initiated by a joint business/IS team can produce both hard-dollar and soft benefits, *CIO Magazine* and Booz·Allen & Hamilton are cosponsoring the second annual ESPRIT Awards. The honorees will be public and private companies, government agencies and not-for-profit organizations which have proven that strategic IT investments can have a positive and sustained impact on the bottom line. Winners will be honored at an awards ceremony and profiled in the January 15, 1995 issue of *CIO Magazine*.

CRITERIA

Winners will be chosen by a panel of independent judges from among entrants who have sent in completed application forms by May 16, 1994. Entries will be judged on the following criteria:

- The extent to which the system furthers the organization's strategic objectives.
- The measurable financial return the system provides to the organization.
- The level of partnership achieved throughout the course of the project by the business unit and the IS organization.
- The extent to which IT was key to the achievement of the overall business solution—the "couldn't have done it without technology" factor.

Telephone interviews, and in some cases face-to-face interviews, will be requested by the Booz·Allen screening teams. These teams may elect to visit the applicants'

sites in order to review in greater depth the system and the environment in which it is functioning, and to examine financial results.

ENTRY GUIDELINES

- The system must have been *operational* prior to July 1, 1992.
- Entries must be made jointly by the IS executive AND the business-unit executive for whom the system delivers value.
- Entrants must agree to be featured, along with their system and organization, in a *CIO* article.
- Entries must be complete. Incomplete entries may be returned for elaboration or disqualified.
- Entries must be on 8.5x11-inch paper, one side per sheet.
- The application form may be reproduced.
- Multiple entries from one company will be considered, but each entry must be submitted separately.
- Vendors, public-relations and advertising firms, consultants and other third parties may NOT apply on behalf of another firm. They are encouraged to forward this form to the "owner" of the system, or to contact *CIO Magazine* to recommend that an application form be sent to their client.
- All entries must be computer-generated or typed; no handwritten entries will be accepted.
- When feasible, an additional copy of the entry should be sent on a 3½ -inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with *Microsoft Word* and *Microsoft Excel* on an IBM or Macintosh platform.

DEADLINE

May 16, 1994

MAIL TO

ESPRIT Awards
CIO Magazine
492 Old Connecticut Path
PO Box 9208
Framingham, MA
01701-9208

1. COMPANY/BUSINESS UNIT

NAME OF PARENT COMPANY:

CITY, STATE WHERE HEADQUARTERED:

IF A COMPANY, IS IT ☐ PUBLICLY HELD? ☐ PRIVATELY HELD?

ANNUAL REVENUES:

INDUSTRY:

NAME OF BUSINESS UNIT OR ORGANIZATION:

CITY, STATE WHERE LOCATED:

NUMBER OF EMPLOYEES AT BUSINESS UNIT:

2. ENTRANTS

NAME OF ENTERING BUSINESS-UNIT EXECUTIVE:

TITLE:

NAME OF DIVISION, DEPARTMENT OR UNIT:

ADDRESS:

CITY:

STATE: ZIP:

TELEPHONE: FAX:

() ()

NAME OF ENTERING I.S. EXECUTIVE:

TITLE:

NAME OF I.S. ORGANIZATION:

ADDRESS:

CITY:

STATE: ZIP:

TELEPHONE: FAX:

() ()

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent

suppliers, customers or others intimately familiar with the system.

A. NAME:

TITLE:

TELEPHONE:

()

REASON FOR INCLUSION:

B. NAME:

TITLE:

TELEPHONE:

()

REASON FOR INCLUSION:

C. NAME:

TITLE:

TELEPHONE:

()

REASON FOR INCLUSION:

D. NAME:

TITLE:

TELEPHONE:

()

REASON FOR INCLUSION:

4. THE NOMINATED ORGANIZATION

Please tell us about your organization (company, business unit, agency) in 500 words or less. Include information on:

- when the organization was founded;
- mission statement;
- major products and services;
- markets served;
- any other data you believe to be relevant in terms of general background.

5. THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to the organization by completing the following sections. Please limit your material to five pages.

- **Objectives:** Identify the primary business objectives of the IT investment.
- **Scope and Impact:** Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business. Identify other business-change initiatives tied to the IT investment.

- **Furthering Strategic Objectives:** Describe how the technology investment is furthering the organization's strategic objectives, including any new business initiatives. Note any significant event that would help us evaluate the nominated system's value. Examples might include a merger, a new distribution channel or a significant regulatory change.
- **Partnership:** Describe how the business unit and IS organization worked together throughout the project—from concept to implementation. What were the specific tasks fulfilled by the business unit? IS organization?
- **The Importance of IT:** Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

6. TECHNICAL PROFILE

Briefly describe the technology of the nominated system. Please include the names of major vendors and products. If you prefer, you may attach a document containing a technical description of the system, providing it is no more than five pages.

NOTE: The examples provided here are meant to be illustrative, not all-inclusive.

- **Architecture** (e.g., client/server, distributed, main-frame)
- **Hardware** (e.g., mainframe/parallel processor, minicomputer/server, desktop computers, handheld/portable devices)
- **Software** (e.g., operating systems, database system, shells, application software)
- **Software development tools** (e.g., CASE, 4GLs, GUI developers, object-oriented development tools)
- **Networking/communications hardware, software and services** (e.g., modems, routers, electronic-mail packages, carriers and public networks)

7. TRUTH OF INFORMATION/RELEASE

The following release must be signed by both nominating executives if the application is to be considered. Unsigned releases will invalidate the entry.

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the ESPRIT Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the ESPRIT Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for CIO Magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

SIGNATURE OF NOMINATING BUSINESS EXECUTIVE:

DATE:

SIGNATURE OF NOMINATING I.S. EXECUTIVE:

DATE:

8. OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in CIO Magazine? Yes ☐ No ☐

How did you learn about the ESPRIT Awards program?

- | | |
|--|---|
| ☐ CIO Magazine | ☐ Academician |
| ☐ Booz·Allen & Hamilton | ☐ Consultant |
| ☐ IS staff member | ☐ Systems integrator |
| ☐ Other publications | ☐ PR Agency |
| ☐ Vendor | ☐ Advertising Agency |

☐ Other (please identify) _____

C H E C K L I S T

Have you filled out...?

- ☐ Company/Business-Unit, Entrants and Supporters Information
- ☐ Return on Investment Chart

Have both entrants signed and dated...?

- ☐ Truth of Information/Release

Have you included on separate pages...?

- ☐ Nominated Organization
- ☐ Nominated System
- ☐ Technical Profile
- ☐ Additional Return on Investment Material

Have you checked off...?

- ☐ Other Editorial Opportunities
- ☐ How you learned about the ESPRIT Awards program?

9. QUANTIFYING RETURN ON INVESTMENT

Directions

- The table below provides a framework for identifying costs and benefits. Feel free to break down any line item into additional components, or to add new line items if necessary. Please explain how the figures were arrived at, on separate sheets if necessary.
- In quantifying costs and benefits, every effort should be made to quantify strategic and “intangible” benefits (e.g., competitive positioning, risk management). It would be helpful to attach any documents you have prepared that explain the system’s costs and benefits.
- You may also include your own return on investment calculations and frameworks to further explain your return on investment. These can be attached to your application form.

Guidelines for Quantifying Return on Investment

- Provide return and investment figures five years out from initial implementation. If the system has been in operation for less than five years, you may project future investments and returns *based on historical data*.
- All investments and expenditures made before implementation should be included in year “zero.”
- Distinguish actual costs and benefits from projected costs and benefits.
- To the extent the nominated system replaced older technology, the system investment reflected in the tables should be net of corresponding salvage values and ongoing costs.
- Return and investment figures should be stated on an approximated after-tax basis.

NOTE: The examples provided below are meant to be illustrative, not all-inclusive. All numbers are subject to verification.

Investment:	Year “0” 19__-19__	Year 1 19__	Year 2 19__	Year 3 19__	Year 4 19__	Year 5 19__	TOTAL
Technology purchases (e.g., hardware, software, lease payments, amortization)							
System development and implementation (e.g., systems integration and consulting fees, initial training)							
Ongoing system maintenance and enhancement (e.g., updating system, maintaining and replacing software, adding users)							
Ongoing system operations (e.g., ongoing training and consulting, help desks, other ongoing support)							
Nonsystems operational charges (e.g., increased labor or inventory, early retirement program for laid-off employees)							
Total Annual Investment	\$	\$	\$	\$	\$	\$	\$

Total Investment: \$

Return:	Year 1 19__	Year 2 19__	Year 3 19__	Year 4 19__	Year 5 19__	TOTAL
Incremental profits from enhanced revenue (e.g., new revenue streams, productivity improvements)						
Reduced operating costs (e.g., labor, material)						
Reduced capital investments (e.g., capital equipment)						
Reduced inventory						
Indirect cost avoidance (e.g., avoided hiring, fines, fees)						
Total Annual Return	\$	\$	\$	\$	\$	\$

Total Return: \$

Total Return on Investment: \$
(Total Return minus Total Investment)

1993 ESPRIT Award Winners

AT&T Universal Card Services

Marian Browne, *Vice President,
Customer Relationships*

Leslie Palmer, *Vice President,
Emerging Technologies*

City of Chicago, Bureau of Parking

Judith Rice, *City Parking Administrator,
Bureau of Parking*

Paul Vallas, *Director of Revenue,
Department of Revenue*

Complete Health Services Inc.

William W. Featheringill, *President & CEO*

Richard Harley, *Director of MIS*

Los Angeles County, Department of Public Social Services

Ray Garcia, *Bureau Director,
Bureau of Administrative Services*

Lisa Nunez, *Division Chief,
Computer Services Division*

South Florida Water Management District

John Lynch, *Department Director,
Information Systems*

James D. Yager, *Assistant Executive Director*

SynOptics Communications Inc.

John Dick, *Chief Information Officer*

William J. Ruehle, *Vice President & CFO*

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cus-tom-er-ize \ kūs'-tə-mə-rīze' \ *vt*

1: to make a company more responsive to its customers and better able to attract new ones **2:** to customize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide **syn** see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

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TRENDLINES

puting—were developed not to provide external links to other companies but to meet internal corporate needs to speed products to market and shorten product-cycle time. Technology has a way of taking unexpected turns....

"Of course, some may be dismayed by the new American keiretsu. Critics contend that Japanese keiretsu is a closed club of captive distributors and favored suppliers, an arrangement that violates general antitrust tenets and helps keep Japan closed to imports.

"But critics should have fewer such worries about the American variety. Unlike its Japanese cousin, the electronic keiretsu is a club anyone can join. Indeed, the electronic keiretsu may have the advantages of the Japanese version but none of its exclusionary disadvantages." ■

HOME SALES

DING DONG, SOFTWARE CALLING

Taking a cue from Tupperware and Mary Kay Cosmetics, a former Lotus Development Corp. executive has launched a company that sells kids' software directly to parents in their homes. BrightIdeas, based in Concord, Mass., arms employees with laptop computers loaded with top educational programs. These "consultants" then demonstrate the software and take orders at home parties.

BrightIdeas President and CEO Addie Swartz says the company grew out of her friends' requests for advice about the best programs for their kids. They assumed



that because Swartz worked in the software industry, she'd know what was available. She didn't then; but after the birth of her daughter two-and-a-half years ago, she began wondering.

Swartz found many soft-

ware choices but no single source for buying them. She says retail offerings were limited because most educational software sells for less than \$45, and stores prefer to keep more-expensive stock on the shelves. Catalog selections were also spotty. So using the home-party model, Swartz founded a company to market a range of high-quality soft-

ware for kids 3 to 12 years old.

BrightIdeas consultants demonstrate the programs to groups primarily in parents' homes but also at churches, day-care centers, schools and businesses. Consultants, often profes-

CHARITY BEGINS AT THE BANK MACHINE

There's nothing like standing in line for 15 minutes waiting to use a bank machine to leave a person suffused with the love of all mankind. Now bank customers in Michigan can express those

tender feelings by donating to local charities through an automated teller machine (ATM).

Michigan National Bank, based in Farmington Hills, offers the new option on its network of 300 ATMs spread across the state. Users select from a list of four charities displayed on the screen along with the usual deposit and

withdrawal commands. They then make a donation either by depositing a check or cash, or by transferring funds from a Michigan National Bank checking account.

The charities listed are

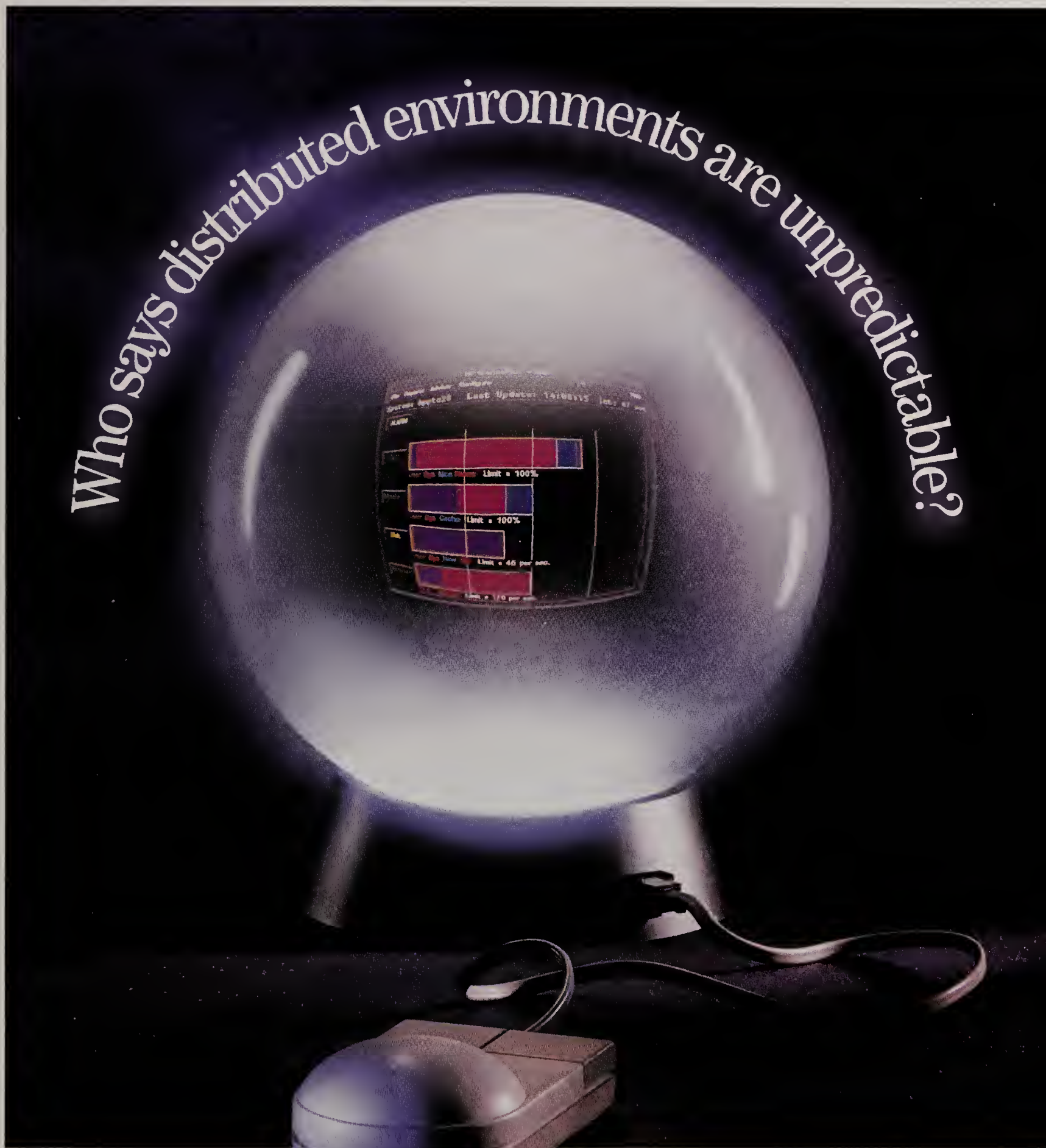
local and vary according to the ATM locations. A customer in Saginaw, for example, might choose to make a donation to the East Side Soup Kitchen, while someone in Richmond might opt for the Richmond Lions Club. Currently, 20 charities are participating in the program, and others may be rotated in later.

Gene Gonya, president of Gleaners Food Bank, one of the first charities included in the program, calls it "one of the most creative applications of high-technology being used to support non-profit organizations."

The program is modeled after one offered by a small bank in Georgia, according to a spokeswoman for Michigan National. ■



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TRENDLINES

sionals taking a break to raise their own families, get a percentage of sales; hosts get free products.

Parents can choose from about 45 products with titles such as *New Math Blaster Plus*, *Muppet Learning Keys* and *A Field Trip to the Rainforest*. There's an interactive storybook called *Flodd, the Bad Guy* and a widget-building program known as *The Factory*.

BrightIdeas uses a chart created by a developmental psychologist to match particular pieces of software to kids' needs and interests at different ages. Software choices have been endorsed by child-development specialists, Swartz says. Previously, some were available only in school systems. Programs come with a 30-day, no-questions-asked, money-back guarantee.

Business is booming. Swartz, who began with four consultants in September 1992, now oversees 36 throughout New England and upstate New York. And with national expansion planned, she hopes BrightIdeas will soon become a household word.

At least one major player is also trying the direct approach of reaching out to potential customers. Last year, Microsoft Corp. launched its national Family Technology Night program, which sends computer-learning experts to parent-teacher meetings. Speakers discuss technology trends in education and demonstrate new software but don't sell products.

For information on BrightIdeas, write to P.O. Box 1034, Concord, MA 01742, or call 508 371-9040.

For information on Family Technology Night, call 800 203-5520. ■

OFF THE SHELF

TIME BASED COMPETITION

**Harvard Business School Management Programs
Boston, 1993
Three tapes (90 minutes)
\$975**

Response time. Lead time. Just in time. Real-time. Time is at the center of many of the ways managers gauge their companies' performance. Yet few treat it strategically, as something they can manage.

That's a mistake, because time is emerging as a key competitive metric and strategic weapon, argue Thomas M. Hout and George Stalk Jr., consultants with The Boston Consulting Group and the minds behind *Time Based Competition*, an executive video from Harvard Business School Publishing. The video program makes the case that using time wisely can mean the difference between winning and losing.

In a world of rapidly globalizing competition, fast-paced innovation and ever-shorter product life cycles, time is a lens through which companies can focus more clearly on their organizations and customers. Focus on cost, Stalk and Hout say, and you could lose quality. Focus on quality, and you may sacrifice cost. Either way, you can lose time. Time, on the other hand, drives both cost and quality. Manage it strategically, and you can achieve all

three.

When Stalk and Hout talk about time, they mean more than working faster—they mean working smarter. They contend that most firms' processes incorporate a great deal of wasted time, which generally increases costs and hurts quality. By identifying and eliminating these areas, companies can simultaneously cut costs, improve quality, simplify processes and achieve better responsiveness.

Long considered a strategic weapon by the Japanese, time also blurs the lines between functions and divisions, and between a company and its customers and suppliers. In addition, time cuts across companies and industries and is intuitive to all managers; cost and quality metrics are often not so clear. Using time-based competition does not exclude other strategies, Stalk and Hout say; rather, it can be integrated with others.

Time Based Competition draws on the concepts and research of Stalk and Hout, who also wrote the

book *Competing Against Time* (The Free Press, 1990). The video outlines many of the key concepts presented in the book and provides examples of the way these concepts were used at companies in the printing, textile, automobile and health-care industries. In Part 3 of the video, Stalk and Hout discuss how managers can apply these ideas to their own companies.

While the video is a valuable introduction to and advocate for time-based competition, more detailed, action-oriented recommendations are found in *Competing Against Time* and in the 28-page publication that accompanies the video. Both are included in the purchase price.

In the coming years, Stalk and Hout say, success will depend upon using cost, quality and time to compete. Managers who want to get the ball rolling now will find a good introduction in *Time Based Competition*. ■



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A Holistic View

CIOs are in a unique position to advance their companies' continuous-improvement efforts, if they can only stop defending their own turf

BY THOMAS J. BARKER AND
MICHAEL E. RAYNOR

Continuous improvement involves learning about business processes and acting on that newfound knowledge to increase the value provided to customers: in short, becoming a customer-driven business. The CIO is arguably one of the most underutilized resources in any company's attempts to implement continuous-improvement methodologies. Because information cuts across all departmental lines, and because IS is privy to how work gets done everywhere within an organization, the CIO can help overcome the bane of any continuous-improvement attempt: departmentalism.

Unfortunately, the power structure inherent in departmentalized organizations frequently hinders CIOs from exercising this leadership. IS executives, like other department heads, must pay almost as much—sometimes more—attention to preserving their own power base than to addressing corporatewide business issues. This situation is exacerbated by a budgeting process that generally allocates resources based on department size.

Thus, CIOs often find themselves concentrating on building up large, centralized organizations rather than exploiting the global view that facilitates continuous improvement.

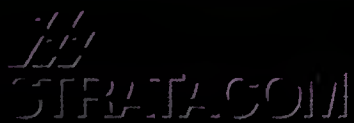
In addition to these structural constraints, cultural issues can impede the CIO's ability to lead continuous-improvement efforts. Chief among these is the shift to customer-focused IS organizations where the word "customer" refers to other departments rather than to the ultimate consumer. In order to better serve these internal "customers," IS is often encouraged to systematically marginalize the true—that is external—customer. Ironically, this belief that IS doesn't need to consider the requirements and desires of the ultimate consumer has robbed it of the ability to integrate the efforts of other departments whose mission is to serve that consumer.

Peter Newson, associate professor of management at the Western Business School in London, Ontario, describes the problem this way: "What we've seen is an explosion in the demands on MIS without any meaningful framework to prioritize requests or resolve conflicts. The business role of the CIO has largely been overlooked in favor of a technology focus. The result has been a proliferation of shopping lists dumped in the lap of IT people, with the overall business issues relegated to the back seat."

The framework of which Newson speaks is provided in some companies by effective leadership from the CEO. Under ideal circumstances, the top executive will articulate a clear vision and a planning process that requires managers to subordinate departmental objectives to the greater good. But where such CEO leadership is lacking, the onus falls upon the CIO to see that IS



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lives up to the full potential inherent in its position and capabilities. Toward that end, CIOs must concentrate their efforts in two areas: what IS staff can do differently within their own domain, and how they can work differently with other parts of the organization.

Perhaps the most important thing CIOs can do within IS is to reorient their organizations to "think through" to the external customer. An internal-customer focus encourages IS to view each department separately rather than to consider how all work together to service the ultimate consumer. IS can be of greater service to its internal customers by focusing on the value that each department contributes to that ultimate consumer.

To accomplish this, IS should concentrate on genuine business issues instead of on internally generated information needs. The idea is to work with other departments rather than either dictating to or blindly serving them. At the same time, the CIO can ensure that a service orientation remains firmly entrenched, thus preventing any further backlash against IS.

A more aggressive approach involves seeking to change the departmental focus of the budgeting process itself. It is this focus, more than any other single factor, that forces the CIO to act like the head of a discrete organization rather than take a companywide view of information. Resource allocation could be restructured so that funding goes to value-adding IT efforts rather than to a centralized IS organization. Naturally, certain skills would remain essential: designing and maintaining databases and ensuring hardware and software compatibility, for example. But a whole department is not necessary to carry out these tasks.

Instead, the CIO would coordinate the efforts of people with IT expertise within the various departments. Issues such as software compatibility and platform and code selection would remain within his or her purview, but such technical issues would be subordinated to concerns about how best to apply information

to meet ever-changing customer needs. Such a role would formalize the CIO's position as a corporate professional with a businesswide view and a focus on the external customer.

But pursuing changes within the IS organization is not enough. Because

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information is generated, used and shared among all parts of the organization, CIOs must also consider the ways in which IS professionals deal with other departments. The failure of most companies to exploit their information assets was made clear in a recent study by Tim Schlange of St. Gallen University in Switzerland.

Schlange analyzed the quality of information systems in six American companies, all considered leaders in implementing continuous-improvement systems. According to his report, the information systems in place at these companies did an excellent job collecting data at the "field" level and transmitting it up the organizational hierarchy. But missing in every case was a formalized system for transmitting information back to field personnel from the executive suite. The loop wasn't closed: Information essential to a continuous-improvement initiative was gathered and transmitted, but in no case was it acted upon.

The mere fact that information, gathered at great expense, is not used deserves real attention. These six companies were chosen for the study because they are considered among the best and most innovative in the country. Given that fact, it is not unreasonable to assume that many other organizations have not closed the information loop either.

Schlange also noted that in all six companies, no significant differences existed among the types of information transmitted to various levels of management. Line managers, department heads and CEOs all received the same information concerning quality and continuous improvement. The only difference Schlange observed was in the level of detail involved: Line managers got raw data while executives got summaries.

This defies logic. In every other aspect of information gathering, it is correctly assumed that different management levels require different management information. After all, CFOs don't waste their time dealing with invoices for office supplies. Yet in the field of quality and continuous improvement, apparently there has been no successful effort to differentiate the information needs of various management levels.

What this means is that information technology is being used as a broadcasting tool rather than as a meaningful decision-support system. The information that executives receive is determined by data-collection capability not business need. It is often not the kind of information they really require. It's no wonder the loop remains open.

To address this issue, the CIO must take the lead in assisting managers to determine what kinds of information they actually act upon, or would act upon if they had access to it. It is not enough to determine how to collect, process and store information. With their holistic view of the organization, CIOs can teach departments what information they can use to improve their abilities to serve the ultimate customer.

Only by approaching their tasks with an external-customer perspective while maintaining their sensitivity to the needs of the internal stakeholder can CIOs build a learning, customer-driven business. **CIO**

Thomas J. Barker and Michael E. Raynor are consultants in the Canadian office of Tennessee Associates International in Mississauga, Ontario, which specializes in helping organizations become customer focused.

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Step by Step

Big projects require LOTS of executive commitment, coordination between business and IS, and buy-in from users. Kodak's Office Imaging division pulled off a massive sales-automation project by taking a methodical approach and keeping users' needs up front.

BY PETER SPARZO

Imagine automating the sales force of a division so large its earnings would place it in the Fortune 500. That's the scope of an automation project that Eastman Kodak Co.'s Office Imaging division recently faced.

Automation systems are usually designed at corporate headquarters, then offered to the field in a "do or die" scenario. But such efforts require the wholehearted support of both corporate and field staffs if they are to be successful. So we adopted a different approach.

Before embarking on the design process, we talked to other Kodak divisions and other companies that had recently changed their business practices in some way. We learned quickly that it is a mistake to develop a field-based program in the corporate office. Daily operations in the field are not the same as daily operations at headquarters, and systems designed without the input of the people who will actually use them rarely deliver the expected benefits.

Moreover, employees resent projects that are designed to improve productivity, for instance, but actually require more time and effort than previous methods.

We wanted to launch our project in such a way that we would receive enthusiastic support from field sales teams. We wanted them to accept co-ownership for its success or failure. For this to happen, we realized we had to let them design it and direct its implementation.

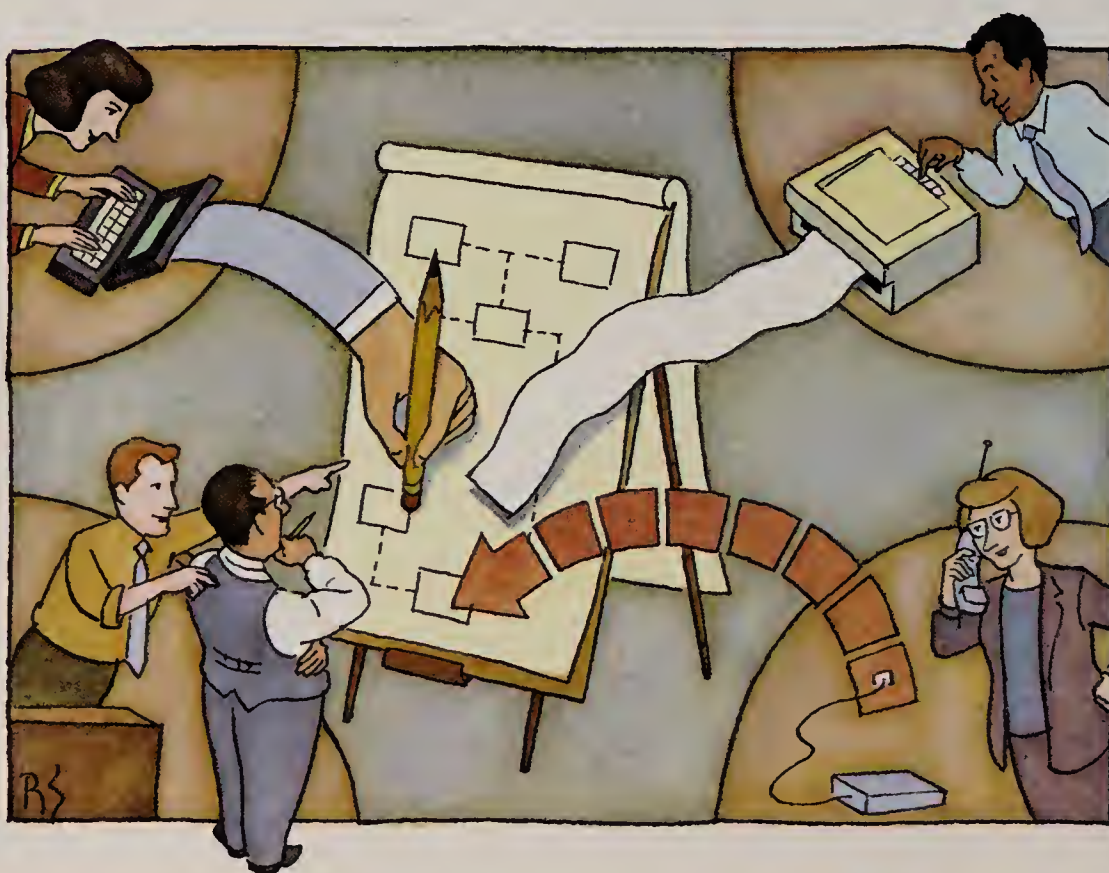
We began by bringing a group of 12 field-based sales reps and managers to our Rochester headquarters for a six-month assignment. Their primary job during this time was to help develop effective sales tools and design an implementation strategy that would gain total acceptance.

First we established a core set of principles and guidelines. All of the input provided to develop these had to meet certain conditions:

- They had to show visible benefit to the customer, sales teams, field management and the division overall—not just the representatives in the field.
- They had to be implementable across all field sales branches.
- They had to provide both a quantity and a quality focus.
- They had to provide both personal and professional development.

With that list of requirements, we began to design new software systems. When we reached the prototype stage for a section of the software program, we asked for feedback from focus groups of sales reps and managers from different branches, who were flown to headquarters for several days of evaluation.

After incorporating this input for all applications, we were ready to begin the launch. We opted to start up the program one sales branch at a time.





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The System in Action

Support from corporate leaders is vital when implementing a major change in operations. Employees commit to change only when they see the full-scale commitment of their managers and know the program is destined to stay. We therefore decided to train managers first, so they could play an active role in the new program. A month before we planned to launch each branch, Reorchestration Manager Stuart Grossman and I met with the branch's entire management staff. We needed to equip our leaders to lead.

After the managers were brought on-board, branch-launch teams—made up of the local district sales manager, a business-process person from Rochester who is intimately familiar with sales, an independent professional trainer and an IS professional (also from the Rochester office) who is proficient in the home-grown software—were assigned to train groups of 10 to 12 sales reps at a time. The branch-launch teams described the business-process change associated with each part of the software program, as well as the new tools we would be supplying. Each team member delivered part of the presentation.

It is impossible to make such a great change in the way sales teams conduct business without encountering some resistance, and we anticipated that some elements of the program would raise eyebrows. But we wanted everyone to be a part of the effort and to understand its importance to the sales teams and the entire organization. So we tried to identify areas that might cause trouble. The following aspects of the program seemed most likely to be questioned.

- We wanted sales-team members

Our new sales-force-automation program equips Office Imaging representatives with laptop computers and personal printers, drastically changing the way our field sales staff inputs and receives information from corporate headquarters in Rochester, N.Y.

The customized software allows reps to build a detailed database on each customer, access corporate data, input order information and use presentation and proposal software. Communications with the home office are expedited: Field sales teams receive new pricing plans and promotions when they sign on to the central host, and new directives, goals and promotions are electronically communicated to the field.

Sales staff upload their orders, which are immediately checked against inventory. The system lets them create attractive proposals in a matter of minutes, and customer information can be pulled from other applications with the software's windowing capability. Responsiveness to customers was a top priority in designing and implementing the system.

—P. Sparzo

to use the security system built into the program.

- We wanted them to adhere to font standards in all customer documents.

- We initiated a set of known, fixed, minimum expectations for each call in the sales cycle.

- And we decided to record, in weekly uploads, how much time each employee spends in each application so that future development efforts would be directed toward applications the field used most.

To diffuse opposition before it arose, we developed a position document that described the rationale behind each of these elements. Without exception, sales representatives read the document, gained an understanding of its long-term value to the organization and offered to support it.

Training was conducted for six days over a two-week period. A few months after training, the launch team met at the field office with sales reps and managers to discuss operational issues and answer questions. Back at Rochester, we evaluated the automation tools, as well as program implementation and training, and applied what we learned to the subsequent branch installations.

Our planning has paid off. Launches have worked flawlessly, sales teams heartily embrace their new tools and morale is high.

Our goal was to deliver a system that provides immediate value to customers, sales representatives, managers and the organization as a whole. This system works. Field sales teams have a vested interest in, and commitment to, the success of the program. The system provides immediate rewards to users: It calculates prospect/sales ratios, reduces redundancy, speeds proposal generation (a full-blown proposal, which used to take up to a

week or more, can now be whipped up in 6 minutes), provides access to information on all accounts and eases account turnover when reps change territories. It also offers penalties to those who do not embrace it: Eventually, all sales orders will be placed and customer activity conducted electronically.

One branch manager presented it this way: The new process we are undertaking is like a train. You can choose to board it while it is standing at the station, or you can attempt to jump on while it's screaming down the track. The decision is yours. 

Peter Sparzo is business process team leader for the Office Imaging division at Eastman Kodak Co. in Rochester, N.Y.

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a desk.”



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INTO AFRICA

• PART TWO •

STORYLINE

A Massachusetts systems-integration firm finds its African venture beset by unfamiliar business practices, political disturbances, economic uncertainty and crucial cultural differences. As Synetics Corp. battles it out with a French competitor for the hearts and minds of West Africa's port managers, the lesson becomes clear: Americans doing business on this continent have much to learn.

As Michael Audige, a port specialist with the World Bank, watched screens change and scroll on a computer monitor, Martin Louri watched Audige. Louri, director general of the ports of Gabon, is usually a genial host, but on this morning in late October, his manner was measured and alert. Audige was visiting the Port of Owendo, near Libreville, to review the port's business, and while there took the opportunity to look at Louri's new computer system. But Audige had become a controversial figure in West Africa—in part because of the computer system he now scrutinized.

Audige hovered before the

computer screen while a representative of Synetics Corp., the American company that installed Louri's PC-based port-management system, ran through a quick demonstration. "This is vessel tracking," said the American, speaking in French. Mouse in hand, he toggled between modules of the application. "And this is equipment and land tracking."

Louri watched Audige nod; Audige's expression was noncommittal.

The World Bank—officially, the International Bank for Reconstruction and Development—is a mighty force in Africa. Since its formation in 1946, the bank has financed billions of dollars' worth of development projects in Africa, including the construction of roads, dams and power-generating plants.

The World Bank's interest in ports isn't trifling: Ports are the fulcrum of trade in West African nations. In fact, about 90 percent of the region's trade passes

BY THOMAS KIELY





Oil or Nothing

Gabon's reliance on oil exports makes the country's economy vulnerable to the dictates of OPEC and world market forces

As one of the smallest nations in the Organization of Petroleum Exporting Countries (OPEC), Gabon has found that membership has its privileges—and its drawbacks. The biggest disadvantage is that Gabon must adhere to OPEC-mandated oil-production quotas, which are set in an effort to stabilize oil prices. Oil is the primary source of revenue in the former French colony, and Gabon could produce millions of additional barrels each year above the OPEC cap—barrels that could bring much needed revenue to the country.

But Jean Ping, Gabon's minister of mines, energy and hydraulic resources, views adherence to OPEC quotas as the tithe Gabon must pay in order to gain some broader advantages. "By being a member of OPEC, we can be a little more involved in the decisions concerning our main product," said Ping, the outgoing president of OPEC, whose tenure was scheduled to end this spring. "Also, there is political benefit to being a member of that important club. But I think [the primary benefit of] membership is that it provides us with better knowledge of the oil market."

That kind of knowledge is critical to Gabon's budget planners.

Volatile swings in oil prices can play havoc with Gabon's economy. During the 1991 war in the Persian Gulf, the price of oil rose to more than \$35 per barrel, said Ping. Just over two years later, it was less than \$16. Fluctuations like this make it impossible to accurately plan governmental expenditures—for instance on health, education, infrastructure, water or electricity—since expected revenues may change before the budget is completed.

"In the long term, we face a slow decline in the price of oil, while the price of imports [such as manu-

factured or industrial products] is going up," Ping said. He acknowledges that his country must diversify its economy. Manganese and timber are important exports, too, but Gabon must strive to develop "industrialization, so that we can add value on our own materials," Ping added.

—T. Kiely

through ports, large and small, that dot Africa's Atlantic coast, from Mauritania in the north to Angola in the south.

On the previous day, Audige had addressed the opening session of the 18th annual council of the Ports Management Association of West and Central Africa (PMAWCA), held in the spacious hilltop parliamentary building in Libreville. Audige's audi-

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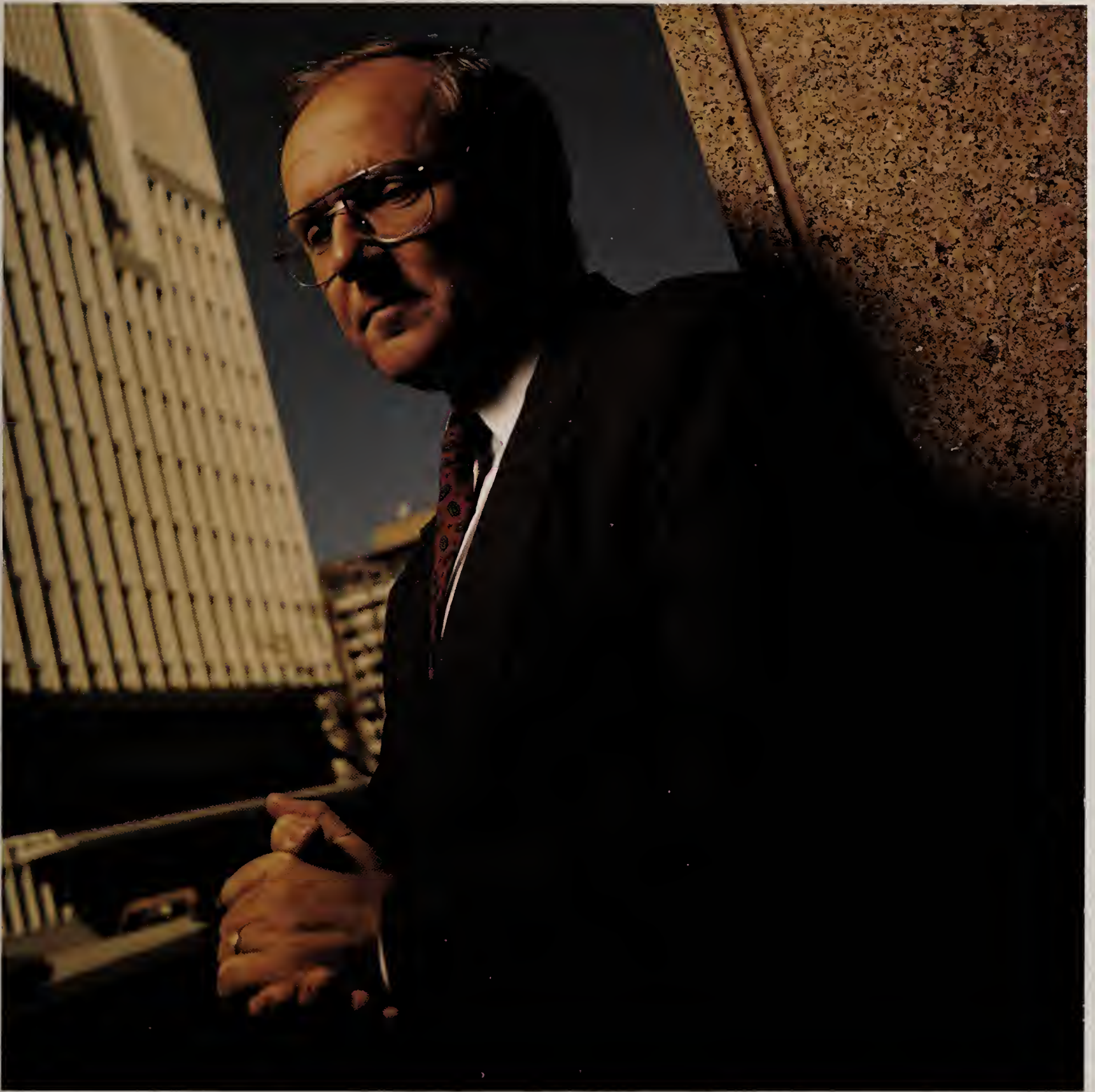
ence—senior-level managers from more than 20 ports in 13 West African nations—had high expectations: Rumor had it that Audige would announce his institution's intention to advance a few million dollars toward the cost of computerizing ports in PMAWCA member nations.

The rumor carried weight. After all, the African managers knew that the World Bank wanted their ports to standardize customs procedures and statistics. Technology offered one step in that direction: Common applications foster common business information. To that end, in the week before the opening session, a subcommittee of delegates had crafted a resolution that consensually favored the system Louri had purchased for the Port of Owendo. What's more, Louri—outgoing president of the PMAWCA—and his American technology partners had been treating the rumor as fact for several days before Audige spoke.

But Audige did not give the speech his audience had expected. He reminded managers that trade in the region had stagnated (a consequence of the lethargic economies of



JEAN PING acknowledges that Gabon must diversify its economy and develop industrialization.



MICHAEL AUDIGE urged West African port managers to take steps to improve long-term productivity.

developing nations and saturated markets for many African exports). He urged them to tackle "initiatives to increase long-term productivity," such as reducing the length of time a ship waits in port. He entreated his audience to seek ways to reduce pollution in ports and harbors. But he did not pledge a dime.

Now, a day later, as Audige examined Louri's new port system, it was clear that there had been a misun-

derstanding between Audige, Louri and the enthusiastic Americans from Synetics, of Wakefield, Mass.

Louri listened as the American answered Audige's questions. To an observer, it appeared as though the three (speaking in French) were making an effort to comprehend each other clearly. Elsewhere in Libreville, the African port managers wondered whether the confusion had begun with the banker or Synetics. Privately, many suspected that the Americans—new players in the commerce of the region—had misinterpreted something.

French managers long accustomed to doing business in Africa are convinced that Synetics and other U.S. firms have much to learn about making deals with African buyers such as Louri. American newcomers to Africa have no idea what they are in for, insisted Jacques Paul, director of operations and development for the Port Autonome de Rouen. His own experiences are illustrative. Rouen sells dredging services throughout West Africa and more than a year ago cleared the harbor at Point Noir, in the Republic of the Congo. Today,

Rouen is still waiting to be paid. Paul isn't worried, however. Silt is filling the Congolese harbor. Paul knows that Congo will eventually rehire Rouen to dredge the harbor once again—but first Congo will have to pay the original invoice.

"How can you do business that way?" Paul was asked.

Standing on the deck of a French ship berthed at the Port of Owendo, cocktail in hand, Paul shrugged. The opening ceremonies of the council of the PMAWCA had taken place that morning, and now the ship's captain was playing host to council delegates. The party had spilled out of

THOUGH GABON COULD ILL AFFORD IT, THE NEW COMPUTER SYSTEM WAS A MUST: THE PORT OF OWENDO'S ANCIENT COMPUTER WAS LOST IN A TYPHOON IN 1992.

the ship's confining quarters and on to the deck, where chatter in two languages drifted off into the dark African night.

"It is a different way of doing business," he said. "To do business in Africa, you must be patient, by Western standards."

Another example: Port Autonome de Marseilles earns between 5 million and 25 million francs a year in sales of its port-management system, Escale. (Total revenues for the port are about 900 million francs a year.) The manic swings in revenues reflect the long sales cycle and the difficulties customers have obtaining financing and paying bills. It is not the kind of business climate that readily attracts American managers.

On the face of it, Africa seems to be poor terrain for growing money. Many of the continent's nations are struggling with debt and underdevelopment. In Gabon, for instance, the balance sheet is a bean counter's

nightmare. An oil nation, a member of the Organization of Petroleum Exporting Countries (OPEC), Gabon enjoys one of the highest per-capita annual incomes in Africa (\$4,400). Essentially, Gabon makes its living by leasing its resources to outsiders. But the government has managed its spending poorly, especially after the price of oil—Gabon's primary source of revenue—plummeted in the late 1980s. (Gabon has developed few industries of its own.) Faced with political unrest in recent years, the government has been slow to enact reforms pushed by the International Monetary Fund and the World Bank. Now the country is struggling to restructure its debt, which amounts to over \$3 billion—about 65 percent of its gross domestic product. Gabon has fallen 18 months in arrears with its creditors, mostly French banks.

Rene Baleyrier, chief of general engineering services at the Port of Marseilles, said that unstable economies are not the only difficulties that American companies such as Synetics face in Africa. Sales are built upon relationships in the former European colonies there (relationships are also, to some degree, important in Europe, Baleyrier points out), and the relationships African managers have with Europeans are far deeper than those with the newly arrived Americans.

"Africa does not have the same culture as the United States," Baleyrier said. "The weight of [European culture and] history is heavy here." Baleyrier's comments carry the weight of self-interest, however: His employer is Synetics' chief competitor in French-speaking West African nations. The Port of Marseilles markets Escale jointly with the France-based Compagnie des Machines Bull.

Still, several West African managers—including some who are enthusiastic about Synetics' port system—privately agree with Baleyrier.



Synetics has been cultivating African business for three years, with the help of a Boston-based consultant, Mamadou Lamine Savadogo. Savadogo, originally from Mali, helped Synetics forge relationships with local port managers and political leaders.

Synetics' success within the PMAWCA was a tribute to the Americans' hard work—and to Synetics' offering, a client/server solution that was less expensive and more customer-focused than the minicomputer-based Escale. But African managers said they are reserving judgment on Synetics until they see some history behind the installation at the Port of Owendo and a similar installation at the Port of Banjul, Gambia.

Baleyrier added an observation: The importance of relationships to Africans may ultimately unhinge Americans trying to do business here. What relationships are to Africans, contracts are to Americans. Africans will expect Americans to bend, when necessary, to pre-



serve the relationship rather than demand strict adherence to the contract. Americans will calculate their margins based on the terms of the contract—and become frustrated when the ambiguities of relationships intrude and begin to erode those margins. The difference between the two business cultures will engender many misunderstandings, Baleyrier said.

"It is difficult to balance [customer] demands with what you can do, profitably, in Africa," Baleyrier said. "But we [French] know this environment. We have experience in it. We can more easily work in this environment than Americans can."

In cash-strapped Africa, sales depend not only on relationships but often on the largess of international organizations. Deals frequently require outside capital. The

International Development have helped finance a host of other development projects in Africa.

Managers of African ports hope to win international financing for new technology in the years ahead. They realize that they need technology not only to improve the efficiency of their ports but also to compete in a fast-changing global economy. They do not want to be left behind by the developed nations—as many African ports were when shipping technology changed in the 1970s and 1980s. They look for encouraging signs everywhere, even in speeches delivered by World Bank representatives at their conferences.

Louri personally did not need the World Bank's money. He had already secured approval from his government to spend the \$700,000 (\$500,000 plus expenses) needed for the Synetics system. Though Gabon

European Union has helped finance sales of Escal to ports on the Mediterranean Sea. The World Bank, the African Development Bank, the United Nations and the U.S. Agency for

could ill afford it, the new computer system was a must: The Port of Owendo's ancient computer was lost in a typhoon in 1992. Of course, it also helped that Louri's boss was Ali Bongo, son of Omar Bongo, president of Gabon since 1967.

But other African port managers were disappointed by Audige's speech at the opening session of the PMAWCA council—they read his failure to pledge money as a discouraging sign. Among the disappointed was Alpha Barry, director of finance for the Gambia Port Authority. Barry had helped push through a resolution by the PMAWCA that directed Synetics to implement in the Port of Banjul, Gambia, a system similar to the one Louri had purchased. If the implementations in Gabon and Gambia proved satisfactory, the group would bestow a seal of approval upon Synetics' offering. This would not require PMAWCA member ports to purchase the Synetics system, but it would carry weight with port managers' bosses and governments—as well as with international lending institutions such as the World Bank. It would smooth the way for Synetics to sell its system up and down the coast of Africa.

Barry declined to pass blame onto Audige, Louri or Synetics for the dashed expectations. But he insisted that if Synetics wanted to sell him a system, the American firm would have to find the financing somewhere because Gambia wasn't going to pay for it. Gambia is an exceedingly poor nation, with a gross domestic product smaller than the annual revenues of most Fortune 500 companies. Barry knows that Synetics has yet to see a return on its three-year investment in Africa. To achieve that return, he understands, the company must harvest additional contracts in West Africa—which means Synetics must try to fulfill the terms of the PMAWCA resolution. Banjul must get its system.

Soon after Audige visited Louri's port—and looked over the Synetics system—Barry met with Synetics executives and pressed the advantage he knew he had.

The push to sell in Africa has not been easy, conceded William O'Halloran, Synetics co-founder, several weeks after Audige's speech. His firm has made slow progress on the continent, carefully cultivating the relationships that must be developed before the sales dance begins. His employees have made mistakes and recovered, learned from those mistakes and pushed on. But O'Halloran is convinced that his company will eventually recoup its African investment and make money—in fact, that Synetics is at last on the verge of success.

The negotiations with Gambia are sticky, O'Halloran acknowledged, but the Port of Marseilles "would have to get the money [to make this deal], too." Since Gambia is an English-speaking country, Synetics has the edge over competitors like the Port of Marseilles, anyway—so in a sense, Gambia is trying to play hardball with a sole source vendor. (Barry denied this: He would shop anywhere, he claimed.) But more importantly, said O'Halloran, "we have developed relationships that won't go away. The opportunities are there for years to come, and I know they will pay off."

One opportunity may be on hold, for now. Gabon has hired Synetics to provide additional training for employees at the Port of Owendo on the Lotus Notes-based port-management system that Synetics installed in October. But Gabon has recently been in turmoil. Internal opposition to the country's pro-French government turned violent in February, following France's decision to devalue by half the African franc used in Gabon and other former French colonies.

In recent years, many Gabonese have begun to question the political and commercial influence France exerts over their nation (see "Into Africa" Part I, *CIO*, April 1, 1994). But with the reelection of Gabon's longtime president, Omar Bongo, at the end of 1993, and France's devaluation of the West African currency, simmering antagonisms exploded. A British photographer, who traveled to Gabon

in February for *CIO*, reported that a number of people were killed in Libreville in violent clashes between the military and angry mobs. Mobs attacked cars and burned buildings, and a general strike shut down the port.

Political disturbances, economic uncertainty, sales based on relationships and unperceived cultural differences are among the challenges that American companies face in Africa. Few may choose to follow Synetics' path: The Wakefield company blazed its own trails and muscled on through challenge after challenge. Instead, corporations with an eye on Africa—especially French-speaking Africa—may follow the advice of U.S. Ambassador to Gabon Joseph Wilson: Partner with Europeans.

"The French presence [in Gabon] is a demonstration of the inefficiencies of monopolies," Wilson said. Gabon needs to diversify its economy, and in the short run, head-to-head competition between French and American companies (like Synetics) can only help it do so. "But over the longer run, neither the French nor we can do it alone," Wilson added. Moreover, the only way Gabon can pare down its debt is to sell off government-owned businesses. If this happens, the French may not have pockets deep enough to take advantage of the opportunities.

Audige certainly believes that Synetics should team up with the French to do deals in Africa. Synetics' microcomputer-based system is intriguing, Audige said several hours after his visit to the port—but he insisted he must reserve judgment on it. "It is too early to tell if this will work," he said. "This system seems to be good for small and medium-size ports," but it is still largely a prototype. He wants to see how the system performs over time in the Port of Owendo and watch how Synetics performs as a vendor in Africa.

Teaming up with French vendors, such as the Port of Marseilles, would benefit customers, Audige said. Synetics lacks experience in French-speaking countries, Audige continued—he believes French partners

could add depth to Synetics' efforts. Moreover, the French port-management systems are sturdy and have proven their worth at many ports in Europe and Northern Africa. The French system is also more robust: It was developed by port managers for port managers.

On the other hand, Audige is impressed with the fresh new approach the American company has taken to sales in Africa. "Synetics is very keen to involve people in the design of the system, and that is quite new for Africa," he said.

But not everyone is so confident about the value of Franco-American partnerships. While the Port of Marseilles' Baleyrier said he is open to the idea, he isn't convinced there is much enthusiasm for tag-team marketing among the prospective players. Similarly, Paul Olinski, the Synetics senior vice president who heads the firm's international and commercial operations, recently said that he is "not encouraged" about a partnership with Marseilles.

Baleyrier worried that partnerships are a moot issue. "The fashion now is dealing with Eastern European countries," where it is easier for companies to conduct business and easier to make money, Baleyrier said. "Africa has suffering and disease, but it also has very many resources. I think now the African market is [being] forgotten, and that is a pity." 

CORRECTION

Due to a production error, a sentence was dropped from "Into Africa, Part I" (CIO, April 1, 1994). The paragraph, which begins on the top of Page 36, should read as follows:

"Fouad looked wretched. Synetics had been cultivating West African sales for three years, and managers from several of the ports that dot Africa's Atlantic coast were interested in the system the company offered. But passage of the recommendation remained a critical hurdle. It would legitimize Synetics as a player in this market and perhaps open up new avenues of financing for prospective customers."

RemoteWare, and the CONVERSION OF JARED FARRELL.

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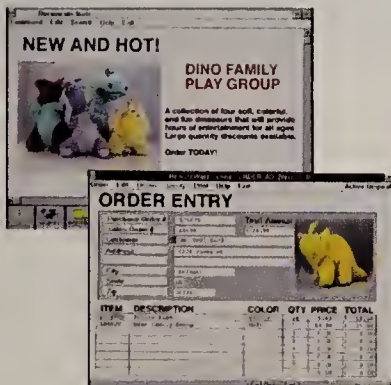
one attempt at automating field communications.
The near-daily software updates. Nightly commu-
nication sessions that didn't. Inventory that wasn't.
Prospects that...weren't.

So the fact that something called RemoteWare®
had been implemented to automate sales processes for
farflung laptop jockeys like himself had held little charm
for Farrell. A client/server system built with software
tools already happily in use in hundreds of large companies world-

wide, with automated dial-up communications for transporting centrally-created electronic forms, documents and reports
between home office legacy systems and even the most remote PCs? Terrific. Plus routing and query facilities to make sales-
critical information simple to get and easy to use...on the road. Excuse me?



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But within just days of the fading hook shot that sent the CIO's announcement
memo into Farrell's round file, he was using the new applications electronically dispensed by
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Mike Quintero



Don Black

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THE PAPERLESS OFFICE

REVISITED

Electronic document imaging is supporting a renewed push in many companies to do away with paper. But today, the emphasis is less on cutting costs and more on improving the effectiveness of the organization.

BY DAVID H. FREEDMAN

I**N THE 1970s**, the paperless office seemed as inevitable and imminent, in a vaguely futuristic way, as cheap nuclear power and putting a man on Mars. The idea was also as thoroughly discredited in the 1980s as were its cousins. But a funny thing has happened to the paperless office on the way to the junk heap of faded great ideas. It appears to be making a comeback.

The new emphasis on doing away with paper, however, has less to do with cutting the costs of filing and maintaining mounds of paperwork—one of the prime motivators of the original concept—than it does with improving the organization's effectiveness. Compared with bits of data, paper is slow, fragile, diffi-

cult to distribute widely and prone to be misplaced—all of which can impair customer service. Yet people don't want to give up the "look and feel" of paper documents, nor the legal weight. The solution: document-imaging systems that store and distribute digital replicas of the paper they replace. Recent advances in technology—particularly the advent of client/server systems that are adept at storing images and making them accessible at low cost to desktop computers—have fueled the trend.

Following are three case studies of organizations that have employed electronic document imaging to help transform the way they interact with customers.



LITTLE TIKES

Dueling Paperwork

IF A CUSTOMER CLAIMS you haven't shipped what you think you've shipped, you've got a simple choice: Prove you're right or start issuing credits.

"When it comes to dealing with shipping claims, he who has the best paperwork wins," says Sharon Petrella, director of infor-

mation systems for Little Tikes Co., a Hudson, Ohio, toy-manufacturing division of Rubbermaid Inc. that accounts for roughly a quarter of the company's \$2 billion in annual revenues.

Little Tikes found itself losing the paperwork contest too often. For one thing, the three clerks who process shipping claims were collectively spending some 60 hours a week trying to track down order confirma-

"When it comes to dealing with shipping claims, he who has the best paperwork wins."

—Sharon Petrella

tions, invoices and bills of lading, leading to a customer-irritating backlog of more than three months' worth of claims. Customers even had to wait as long as several weeks just to get another copy of an invoice. In addition, the claims department often paid out on a claim for which the accounting department had already issued a credit because the paperwork was caught in the shuffle between the two. And in many cases, Little Tikes paid out on erroneous claims simply because misfiled paperwork couldn't be located. Clearly, claims processing was crying out for automation.

Little Tikes has actually long been aggressive in applying IT to its customer interactions: 80 percent of its orders come in through electronic data-interchange systems, and the company will soon be taking in most of its customer payments via electronic funds transfer. But when it comes to proving to a customer that a product was shipped as instructed, says Vice President of Finance Nathaniel Smith, you've got to be able to provide conventional documentation. "I don't think any customer would settle for a computer report," he says. "I know we wouldn't."

The solution was PC-based document-imaging software from Plexus, integrated with the order-entry and financial systems running on the company's HP 3000 mid-range system from Hewlett-Packard Co. Now all the forms relating to confirming, shipping and invoicing for orders are generated by pulling down the relevant data from the HP 3000 and then electronically inserting it into a digital template of a blank form that resides in the imaging system. The completed form, which looks exactly like the paper version, is then stored in an image database. Forms that require signatures are printed, signed and then placed in a scanner to get them into the database. Paper versions of all the forms are printed and sent to customers, but Little Tikes keeps only the images.

Order data is sent via radio transmission to the warehouse. Pickers there receive the data on portable computers and then fill the orders, thus eliminating paperwork completely from the order-fulfillment process.

The new system obviously cuts down on manual filing chores, but the real payoff comes in processing shipping claims. Now a clerk faced with a claim simply calls up an electronic "folder" for the customer containing images of all relevant forms. If the customer is mistaken, the forms that prove it

can be printed and faxed on the spot; in fact, the company is setting up a fax gateway that will allow documents to be faxed directly from the computer, without having to be printed first. The imaging system and the accounting system also swap information on claims payments, so if the customer's claim proves valid, Little Tikes can get the payment out right away—without fear of duplication. The company has whittled down the claims backlog to one month and plans to further shrink it to two weeks.

The entire system, including hardware, software and custom development from Indianapolis systems-integration firm Crowe Chizek & Co., cost \$375,000. "We did not justify the system based on not having to hire additional claims-processing clerks," says Petrella. "We think the more important justification is in the soft cost savings from providing better customer service and more tightly managing our claims chargebacks."

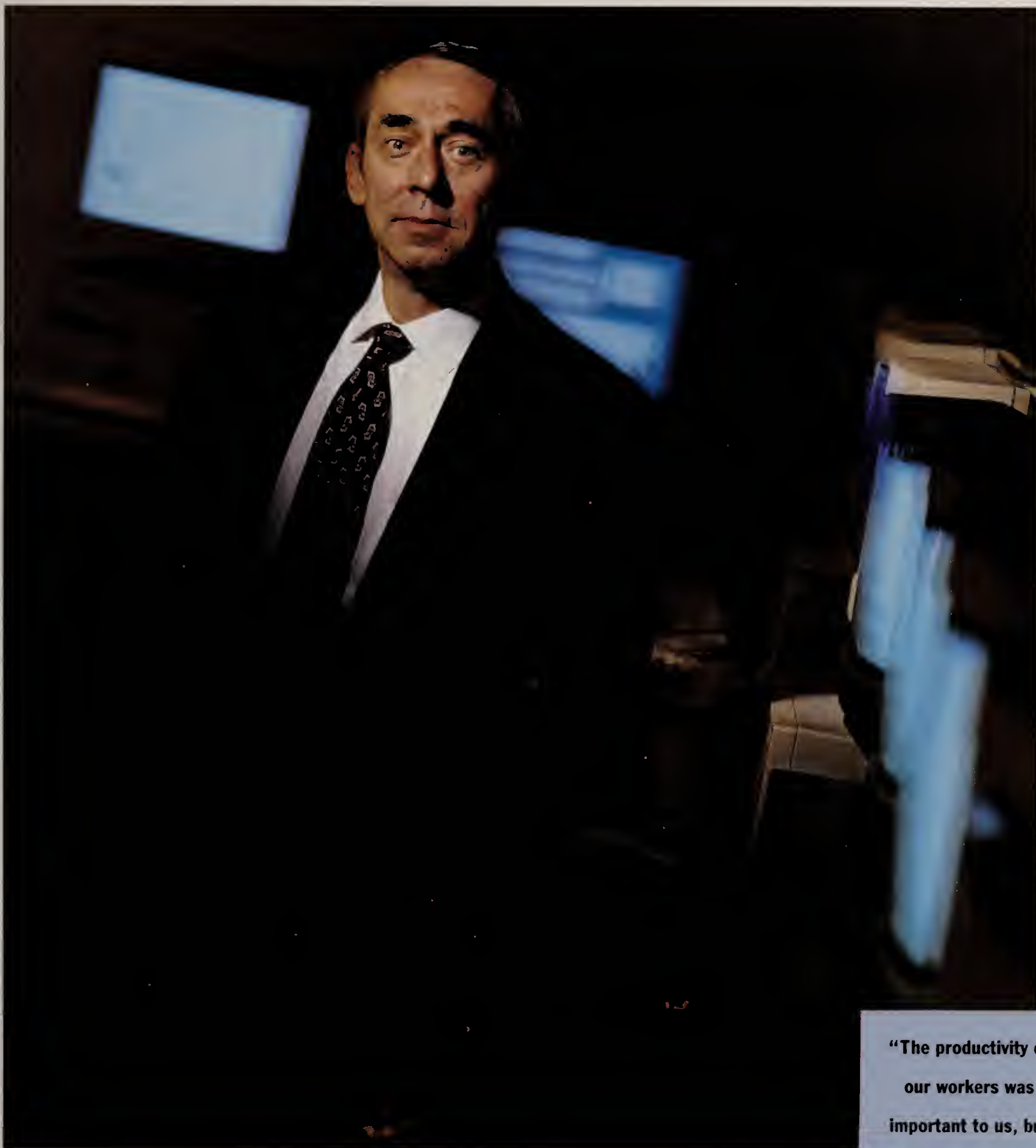
Little Tikes has only one complaint with the system: The relatively small, low-cost, optical-disk jukebox it uses is on the poky side, keeping clerks waiting as long as a full minute to pull up a file during peak-usage periods. "But," notes Petrella, "that's still a lot less time than it would take to get out of your chair, walk to a file cabinet and find the folder missing."

SALLIE MAE

*Graduating to a
Better Class of Document*

THE STUDENT LOAN Marketing Association, or Sallie Mae, is a federally chartered, publicly held corporation that backs banks in the issuing of student loans. Headquartered in Washington, it is one of the 20 largest financial-services companies in the United States, lending through banks some \$8 billion a year to 4 million students and maintaining more than \$46 billion in assets. So when Sallie Mae says it has a paper problem, you can guess it's a big one.

Specifically, the company receives some 24 million loan-related documents a year and must make the information in those documents accessible to 3,000 of its 4,800 employees in seven regional loan-servicing centers scattered between Lawrence, Kan., and Panama City, Fla. "Our people were spending all their time pushing paper," says Patrick Hackman, vice president of operations management.



**"The productivity of
our workers was
important to us, but
the real driver was
being able to improve
customer service."**

—Patrick Hackman

And the problem was getting worse. In recent years, the number of loans backed by Sallie Mae has grown by 18 percent a year, and the number of documents associated with those loans, by 25 percent. There is now an average of 22 forms per loan file, and files have to be maintained for as long as 33 years. The situation might not be so bad if the company could just file them and forget them. But even after the loan is initially approved and processed, any number of events

can require that the file be dug up again. For example, a high percentage of students who have graduated or quit school and are paying off their loans end up receiving deferments because they return to school. And the 1,500 banks, credit unions and other loan issuers that work with Sallie Mae often request information about the status of the loans they issued when the graduated students become prospective customers for car loans or mortgages. "The productivity of our workers was

important to us," says Hackman, "but the real driver was being able to improve customer service."

There was a lot to improve. Sallie Mae employees who needed to get ahold of a file to answer a customer question had to go to the regional center's vault to retrieve it. Often, the file was scattered among some of the 15 different departments into which the center is divided, so the average time required to get an entire file together was one week. And that was if the file was actually located at that employee's regional center; in some cases, files had to be shipped from center to center, wasting several weeks while a customer waited for an answer.

To help at least figure out where the paper was, the company tried out in the early 1980s a computer system that required employees to enter in what task they had performed with each file and where they had routed it. It was a flop. "People would get

busy and forget to enter the information," says Hackman. "It wasn't improving service."

Sallie Mae finally decided that the only way to make a big dent in the problem was to move to electronic imaging. The company entered into a five-year, \$55 million contract with systems integrator Price Waterhouse. That price included hardware, software and support; Sallie Mae's internal IS department is spending an additional \$2.5 million on developing related loan-processing applications. The first components of the new system are coming online now, and when the implementation is complete by the end of next year, it will be one of the largest business imaging systems in the world.

Papers that come into a regional center will be placed in a scanner, and copies of the digital image will be stored simultaneously on a magnetic disk and two optical disks. The image will remain on the magnetic disk for

Critical Success Factors

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While individual requirements can vary, certain features will be part of most good imaging systems

Electronic document-imaging systems require a variety of equipment. According to Scott McCready, director of imaging and workflow at International Data Corp., a Framingham, Mass., market-research firm (owned by CIO's parent company, International Data Group), the necessary technology includes a scanner, a printer, desktop computers, a network, high-resolution monitors, a database, an image index, magnetic storage (op-

tical storage is optional) and either a network server or a dedicated image server.

The following are features that McCready recommends for a good imaging system.

INPUT

- Support for a wide variety of scanners
- Electronic forms removal, which allows the content of an image to be stored separately from the format, thereby saving storage space and improving retrieval time
- The ability to bar-code documents, independent of the particular scanner involved, for indexing purposes

STORAGE

- Image and image-index databases distributed across multiple servers
- A structured query language (SQL)-based database-management system for the image index
- Automatic data migration between image servers so that images can be stored locally while

they are in use and then automatically migrated to a central location afterward

- Separate and explicit support for case closing and archiving so that the system recognizes when a case is closed and then migrates the images to the central server
- Freeing of local database storage after a case is closed and migrated

RETRIEVAL

- Retrieval time of less than one second for local magnetic storage; six seconds or less for network storage; and 30 seconds or less for optical storage
- Overnight staging, whereby new images to be used on a given day are migrated to the local server the night before
- Balanced use of caching at the workstation—where the first part of the image to be worked on is loaded into RAM before the rest is—and pre-fetching, whereby some portion of the images are brought from optical to magnetic storage in anticipation of work needs



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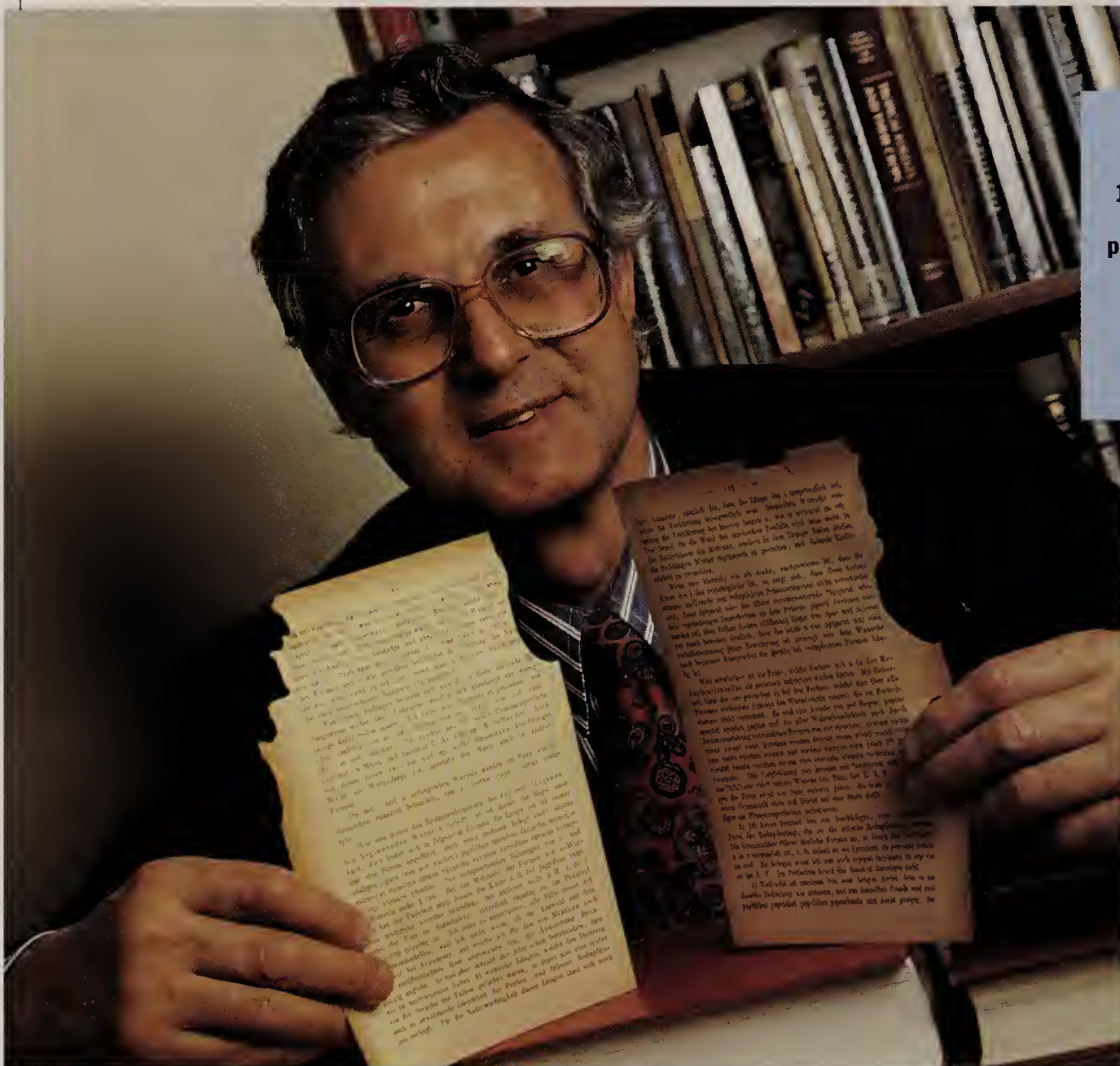
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STUART LYNN: *Thinking of books as "slow movies."*

six weeks, after which time it will be replaced with more-recent data. Meanwhile, one of the optical disks will be sent to a centralized repository in Virginia, while the other goes to a backup repository in Florida.

From now on, when an employee needs to check, change or add to a loan file, he or she will simply enter the loan account number into a PC, which will in turn query the local server for the collection of images that make up the file. In about 95 percent of the cases, according to Hackman, the file will be found on the magnetic disk attached to the server because most file activity happens in the first few weeks after a loan is filed. In the case of having to revisit an older file, the server will pull down the images from the central repository and, if need be, from the other regional centers' servers as well. If changes need to be made, a new image with the updated information is created and appended to the file.

Hackman notes that if Sallie Mae had gone with an architecture that placed all images, including recently entered ones, in a single optical repository and forgone the local magnetic storage, it would have had to deal with

logical] capability to respond while the customer waits on the phone," he says. "But we decided achieving that slightly higher level of service wouldn't justify the cost of hiring the extra people we'd need to provide it."

Still, Hackman isn't counting on being able to rest on his laurels: After all, he concedes, what passes for above and beyond this year could prove to be next year's minimum requirement.

CORNELL UNIVERSITY LIBRARY

*From Brittle Books
to Invulnerable Images*

FOR STUART M. LYNN, document imaging doesn't represent increased productivity or improved customer service as much as it does saving a significant percentage of the human race's knowledge, experience and creativity. That may sound a little dramatic, but how else do you describe the looming loss of virtually every book published since the 1850s?

Cornell plans to help get
100,000 books—30 million
pages' worth—into a growing
national digital library over
the coming years.

20 times as much traffic over its long-distance phone links.

Hackman predicts that the system will pay for itself within three years, considering that without it, the company would now be building an eighth regional center to cope with the growing mountain of paperwork. But more important, he says, Sallie Mae will be able to respond to customer requests more quickly—in almost all cases, within one day. "Actually, we have the [techno-

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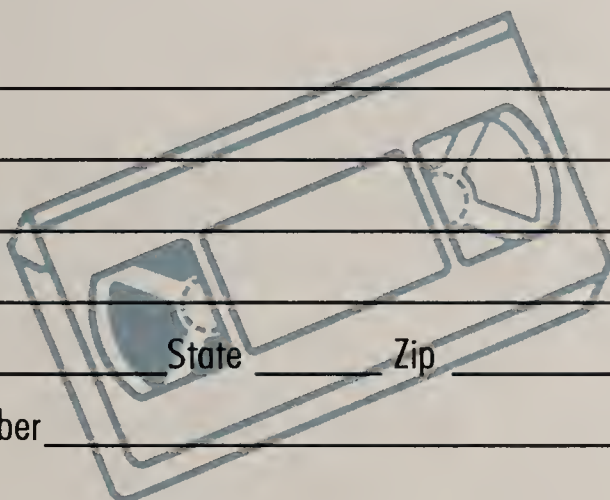
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Lynn, who is vice president of Cornell Information Technologies, and Anne R. Kenney, associate director of preservation for Cornell University Library, believe imaging is the best way to head off that loss. As a bonus, their project is pioneering techniques that will ultimately pay off for other organizations that turn to document imaging.

The problem stems from the cost-cutting decision of publishers in the mid-19th century to raise the content of wood pulp in their paper and add alum sizing as a coating. The result was a more acidic paper that tends to become yellow and brittle with age. Though publishers began in the 1980s to lower the acid content of their books, some 80 percent of all the books in research libraries, or 11 million unique titles in U.S. university libraries alone, are expected to crumble to dust in the coming years.

SOME BOOKS ARE being preserved on microfilm, but Cornell, located in Ithaca, N.Y., has taken a leading role in promoting the storage of books as digital images, which are far easier to distribute and access than microfilm. With the support of Xerox Corp., the university has already built an image database of some 2,000 books comprising 600,000 pages; with funding from a variety of private and government sources, Cornell plans to help get 100,000 books—30 million pages' worth—into a growing national digital library. In addition to storing images of the books, the university will also print high-quality versions of them on acid-free paper to replace the crumbling versions on its shelves. The hope is that other universities will follow suit.

The project has faced myriad technical and operational challenges that are leading to new insights into document imaging. One might think, for example, that it would make sense to root out poorly scanned images before printing them, but the project members discovered that it's faster to print them first and then check the printed version for pages that have to be rescanned and replaced; the university can now scan books at the rate of 300 pages per hour. And given that the images are stored in compressed form, does it make more sense to decompress them at the image-database server before sending them out on the network, making for slower transmission times, or to decompress them at the receiving workstation, where the lower processing horsepower makes for slower decompression?

The answer: Allow the server to make that determination on a case-by-case basis, using a program to take network and workstation speeds into account.

Another challenge involves finding ways to make the digitized book easier for a user at a workstation to navigate. One of Cornell's innovative solutions is to store the book in Apple Computer Inc.'s Quicktime format, which is designed to store and play video. "A book is sort of like a slow movie, where each page is a frame," says Lynn. "If you go through the pages at four or five frames per second, it's like thumbing through a book."

There are also problems relating to the digital-image format. Different workstation software and printers typically require different formats. The image-database server can do the appropriate formatting before shipping off the image, but this requires having the necessary information about the destination device—which is not always the case. And for the longer term, Lynn frets about new formats that may become standards in the future, making current ones obsolete. "Industry did a lousy job of making the transition to new video and tape-backup formats," he says. "How can we guarantee that we won't have to redo everything in 10 years?"

In any case, images aren't likely to completely replace books at Cornell or any other library within the next decade. For one thing, Lynn notes, sitting at a workstation and slogging through 300 pages' worth of 100-dot-per-inch (dpi) images can be an eye-straining experience. (The images are stored at 300 dpi, but the resolution is lowered to allow faster transmission.) But for those who can't get their hands on a particular book at a nearby library, the digital version may be the best option—especially since Cornell plans to make its image database available over the Internet later this year.

Lynn gave himself an experimental taste of the future during a recent visit to New Zealand. "I sat down at a workstation there and dipped into our library here at Cornell as if I were sitting here," he said. "It was a wonderful feeling."

At the very least, it probably feels a lot better than opening a book and having it crumble in your hands. 

David H. Freedman is a freelance writer based in Brookline, Mass., and author of Brainmakers, published by Simon & Schuster.



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Advanced-technology groups used to keep their heads in the clouds and their operational profiles low to the ground. These days, however, increasing pressure is being applied upon ever-more-visible ATGs to deliver strategic technology today.

BY MEGAN SANTOSUS

ADVANCED-TECHNOLOGY GROUPS (ATGs) used to be strictly low-profile research organizations hidden under the umbrella of the IS department. Charged with keeping tabs on emerging information technologies, ATGs typically focused their gaze as far as 10 years into the future. The technologies they investigated tended to be

tered the role that many ATGs now play within their organizations. Increasingly, ATGs are descending from their ivory towers and entering into strategic relationships with business units. In this capacity, they function more like internal technology consultants and less like think tanks.

The driving force behind this shift is

Down *to* Earth

so advanced they were esoteric. Few outside of IS understood—or cared—what these groups were up to, and most were left to carry out their research in relative obscurity.

The dizzying pace of change affecting both business and technology has al-

survival. Emerging technologies that can give companies a competitive edge are no longer years away from deployment, and ATGs can no longer evaluate them in a vacuum, failing to take into consideration their potential contribution to the business.



"ATGs are still concerned with determining technical direction for the future," asserts Bill Caffery, vice president and director of advanced technology groups at the Gartner Group, a research and consulting firm in Stamford, Conn. "But the time frame they are focusing on is now two to five years ahead."

Because of this, ATGs are expected not only to evaluate new concepts; they must implement strategic technologies as well. As a result, the work of ATGs is now a lot more visible—and more likely to be held up to the scrutiny of business units. This is a considerable shift since the early 1980s when ATGs spent the bulk of their energy preparing technical white papers that were rarely circulated beyond the IS department.

In many organizations where information technology is critical, full-time ATGs are taking the lead in working with business units to assess, select and implement technologies that might potentially provide a competitive edge. With IS departments preoccupied with day-to-day operational issues such as upgrading software and maintaining legacy systems, many do not have the time to keep up with ever-changing technologies.

As Caffery sees it, having a small group within IS that is dedicated to evaluating technologies is an effective way to prevent an organization from falling behind the technology curve. "The best ATGs are extremely flat organizations that devote very little time to managing bureaucracies," he says. "They tend to be project-oriented and capable of carrying out a broad mix of tasks."

Once a technology has been evaluated, members from the operational IS department—particularly on a business-unit or divisional level—will often work closely with the ATG to develop a prototype or conduct a pilot. Some of the best ATGs, in fact, are totally dynamic in structure, changing members to best fit the particular project or technology that is on the agenda. And ATGs most often consist of people who have IS as well as business or technical backgrounds. "The people who tend to be good at leading ATGs are a very unusual breed," Caffery says.

"They are more than a little technically astute and also very politically savvy."

SUCCESSFUL ATGS ESTABLISH CON-stituencies among the business units that will eventually implement the technologies they are examining. This requires ATG staff members to complement their technical know-how with the kinds of skills that befit an experienced sales and marketing department.

"We really have to operate on a strategic marketing level because we're trying to

understand which technologies make sense and where they should be implemented," says Kim Sienkiewicz, the manager of technology assessment and evaluation at John Deere Credit Inc., in West Des Moines, Iowa. "In our efforts to select technology with lasting business value, we need to leverage vendors as well as other areas within the IS department," he says.

John Deere is shifting its business emphasis from a product focus to one that is market-driven. As a result, says Sienkiewicz, "we need to implement strategic systems that can help us make money." Thus far, he says, Deere has been very good at

building accounting systems that keep track of the company's finances. What's needed now are systems that can provide Deere with detailed market information about its dealers, customers and competitors. For the ATG, this means looking at technologies that will enable horizontal and team-management structures. More often than not, Sienkiewicz has to convince the IS department that emerging technologies such as multimedia, artificial intelligence and neural networks have important implications for the business and therefore should not be ignored.

"There is a chasm between us and the typical IS organization that has been schooled in certain technologies and methodologies," he says. "When IS bucks against a technology, it's my job to help them understand the business needs." Many in IS are still thinking in terms of 3270 terminals and Cobol, Sienkiewicz says, while the business units are using shrink-wrapped software that ful-

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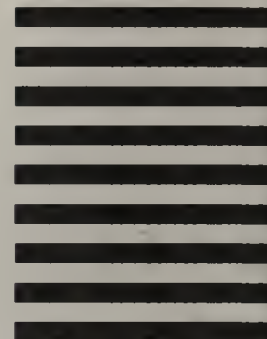
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How Does Your ATG Grow?

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Depending on climate, the corporate soil can likely support only one of a handful of ATG types

Advanced-technology groups (ATGs) come in many flavors, but they are most likely to be small organizations that mirror the corporate culture in which they exist. Bill Caffery, vice president and director of advanced technology groups at the Gartner Group, in Stamford, Conn., has identified the five most common types of ATGs represented in Fortune 1000 companies. (Based upon their effectiveness and longevity, ATGs can be assigned to three stature-related categories, he says: "The endangered species, the favored species

and the emerging species.") Here are the five basic types:

The Priests: Their main role is to explain new technologies to the CEO, CIO and line managers. "Their success revolves around incurring the favor of senior management," Caffery says. But because this type of ATG spends 60 percent of its time on technical issues and 40 percent on organizational issues, it is not sufficiently engaged in politics to garner support over the long haul.

The Scholars: These purely R&D-focused organizations exist in a virtual ivory tower. "Like the priests, the scholars are headed for the dustbin of history," Caffery asserts. "They seal their fate by their characteristic unwillingness to devote more time to political activities or survival tactics."

The Guerrillas: The equivalent of technical SWAT teams, these ATGs "are intrinsically tactical," Caffery says. "Their constituency is found at the grass-roots, line-of-business level because they focus on what works." Caffery believes that 45 percent of ATGs are fall into this category.

The Navigators: These ATGs guide corporations through a deluge of technical uncertainties. "They stress strategic coherence by trying to find the technologies that can be leveraged throughout an organization," says Caffery. Navigators make up approximately 20 percent of all ATGs, he estimates.

The Conductors: Usually composed of two to five people, conductors "act like internal consultants by letting business units know when another unit is doing something that might be of interest," Caffery explains. This type of change-agent ATG is an emerging species favored by companies that have limited resources yet know that they can profit from leading-edge technology.

ATGs are not limited in their roles and may combine several of the above categories. However, given that technology and business are both in flux, the most important characteristic of any ATG is adaptability. "Chameleonlike," is how Caffery describes the ATG most likely to survive. "It is highly dynamic in style, has a good mix of people and will change according to corporate circumstances."

—M. Santosus

fills most if not all of their computing needs. "IS may be skeptical of this new paradigm, so it's my job to help them understand the change by teaching them the business value of the technology," he explains. "The ATG really has to be a business bigot."

As the director of technology assessment and planning at Weyerhaeuser Co., in Federal Way, Wash., John Anderson's mission is to help IS managers adopt technology to support the business. Unlike Sienkiewicz, however, Anderson is not concerned with cutting-edge or emerging technologies. Instead, he is implementing systems that meet Weyerhaeuser's existing standards yet are more advanced than the current installed base. "The focus of our ATG has moved from identifying new technology to adopting and exploiting technology that can be effective for meeting our business needs," he says.

The traditional role of an ATG was to investigate technologies without taking into account the needs of the business. As one of four senior staff groups that report to the IT board, Anderson's group is responsible for assessing specific business needs first and then implementing the most appropriate technology in light of Weyerhaeuser's overall architecture.

The group works on operational issues with business units and the IS department on a daily basis. One member of the ATG is solely responsible for managing Weyerhaeuser's partnership with Hewlett-Packard Co., while others are involved with interoperability testing and integration planning. However, all members work closely with one another to ensure that the group as a whole remains focused on the overall strategies of the business.

THE ATGS AT DEERE AND WEY-erhaeuser have clearly defined roles and working relationships with operational IS groups. Both groups function very much like change agents and intermediaries, helping to bridge the gap between the technical interests of IS and the strategic needs of the business. Because responsibilities are spelled out, the ATGs can coexist peacefully—and productively—with the rest of the IS group. However, in organizations where this is not the case, ATGs might become a way for business units to circumvent an intransigent IS department.

“Many IS organizations are only concerned with maintaining the status quo,” explains Caffery. ATGs that have a political constituency among business-unit managers and a track record of proven business results “will be the groups that can bring about change.” As a result, the credibility of operational IS could suffer.

Although most ATGs remain part of the IS department and report to the CIO, many are closely aligning themselves with business units. At insurance and financial-services company USAA, based in San Antonio, the ATG is heavily involved with transferring knowledge and deploying technology to support all of the company’s business units. “Our biggest effort is to get into the business planning community,” says Gil Merkle, the assistant vice president of advanced technology planning who heads up the 12-member ATG. “We examine the possibilities of technology and of how specific applications can affect our business.”

Merkle’s group is part of the IT planning department, which falls under the direction of USAA’s CIO. With a three- to five-year time frame for rolling out full-scale production systems, the ATG needs to spend a lot of time with end users.

“We get ideas from them as well as try to understand their priorities,” says Merkle. This represents a move away from the predominantly research-oriented functions that

the ATG was responsible for when it was formed in the early ’80s. The group has slowly become more involved with business planning and less with systems planning, and Merkle reports that this shifting emphasis is serving USAA well. His group is working with end users on prototypes that include object-oriented technology and geographic information systems for automobile-rating applications.

The group still performs the traditional ATG functions of monitoring technologies whose implementations stretch beyond a five-year horizon (USAA is watching some 90 technologies with the help of such external research organizations as Bellcore and Los Alamos Laboratories). But it is also helping to define technology concepts, build prototypes and put systems into production, activities that are an integral part of USAA’s current IT acquisition process. For this reason, the group has to be well-grounded in all facets of USAA’s diversified lines of business.

Merkle and his group have frequent brainstorming sessions with planning and IS staff members from the different business units. “Because the divisions drive our technology directions, our role is to help get the brainstorming ideas accepted and moving,” he explains. Once an idea is accepted, the ATG will work on a prototype with the IS support team that will eventually implement and maintain the technology. At USAA, it’s particularly important for the ATG to work with business IS units because technology—such as a recent screen-telephone application—has to operate within the existing architecture.

USAA’s ATG has adopted a phased approach to researching and developing projects. At each step, the technology or concept under review is evaluated on the basis of how much sense it makes for the business. This approach makes it imperative that ATG members keep in constant touch with members of the business community. End users and IS support staff from business units are involved in the initial concept-definition

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phase to determine what an application might look like, what it might cost and what assumptions have to be validated before full-scale deployment is possible. USAA believes that this step-by-step approach is the best way to minimize the chances of making a costly mistake.

Keeping business units informed of the ATG's ongoing work is essential to gaining their support, and this is where sales and marketing skills come in handy. Quarterly reports and monthly news "flashes" are distributed via E-mail, with additional information available to anyone who is interested. "Getting people to understand the potential of technology is a real challenge," says Merkle.

A **SIMILAR CHALLENGE** confronts Vi Beaudreau, director of the advanced technology group at insurance company ITT Hartford, in Hartford, Conn. "Half the battle for us is credibility and marketing," says Beaudreau. Getting buy-in from business managers is best accomplished when research and development efforts enlist end users, he says. For example, representatives from the major lines of business are part of a project team working with Beaudreau's group to develop a companywide strategy for adopting object-oriented technology.

Besides providing reports to business-unit representatives, Beaudreau's group also presents them with the results of pilot projects and demonstrates prototypes on a regular basis. "Rarely does a month go by that we don't do something along these lines," he says. "It's the only way to keep the people in the business units informed of the latest breakthroughs." Once the businesspeople endorse a concept, it falls to the ATG to transfer the technology and share it with those who need to get behind it.

At ITT Hartford, research projects and prototypes are selected annually by IS people from the business units. "Having a democratic process forces us to create a business context for the work we do," Beaudreau

says. "Although I consider my group to be a technical organization, we are concerned with taking a corporate view of technology by trying to figure out how to leverage it and share it across multiple lines of business."

Thanks to the proliferation of news about the link between technology and competitiveness, Beaudreau reports that executives are much more aware of technology developments than in the past. While this goes a long way toward demystifying the ATG's activities,

it also creates expectations. The last thing Beaudreau and his group want to hear is the chairman wondering why another company has a state-of-the-art system before ITT Hartford does.

To ensure that they are staying on top of technology, ITT benchmarks itself with Gartner's ATG service. According to Beaudreau, his group consistently ranks among the best ATGs when it comes to evaluating the appropriate kinds of technologies.

"From a competitive point of view, we don't want to miss a technology," he explains. "Once we hear of another company implementing something, it may take us several months to catch up, so this motivates us to keep everyone well-informed." To this end, the ATG uses online services such as CompuServe and the Internet to gather information.

The group is also building an information repository based on Lotus Notes that executives can access from their desktop machines. Included will be information about competitors and technologies that support business applications.

The importance of information technology means that ATGs now have an opportunity to significantly enhance their organizations' competitive position. Yet with so much riding on selecting the right technologies, expectations can be high. "Given the temper of the times, corporations have a 'what have you done for us lately' attitude," says Caffery.

Increasingly—now that the ATG time horizon has shrunk down nearly to the foreground—"lately" might just mean yesterday. 

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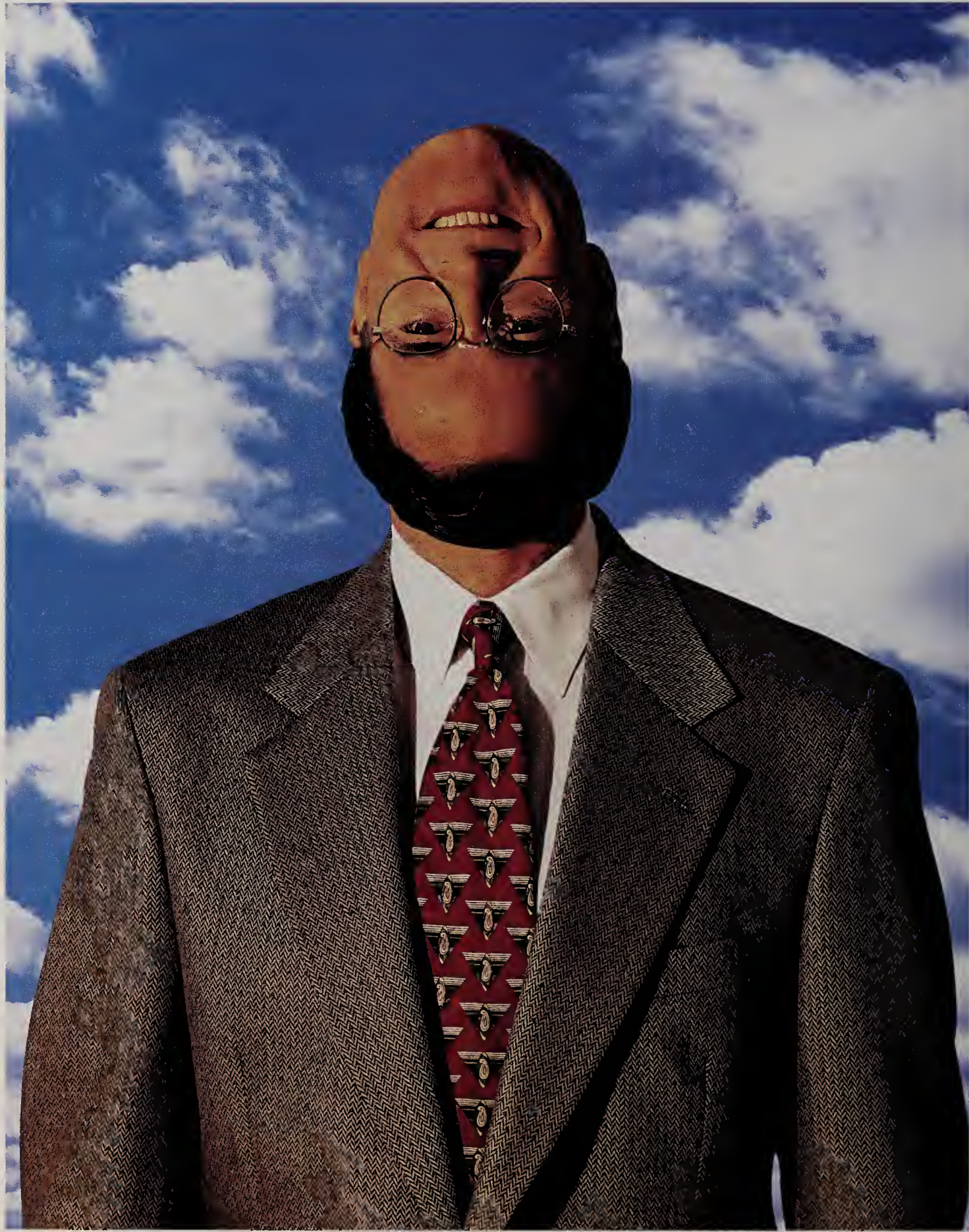
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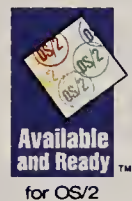
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BY PORTIA ISAACSON

Now that real PDA products are hitting the marketplace, it's time to take another look at what the future might bring

The Promise of PDAs

GLORIOUS GADGETS

Although the road to personal digital assistants (PDAs) and personal communicators has been paved with great expectations, innovative technologies, respectable investments and customers clamoring for products, it is now marked with the headstones of pioneering companies such as GO and Slate. What happened? Where are PDAs today? Are they headed for the hype heap? Or will they eventually fulfill our information/communications dreams?

PDAs will change dramatically between now and 2005. From today's barely useful \$1,000 gadgets, PDAs will evolve into an indispensable family of handheld information tools. By 2005, the average price will be in the \$300 to \$600 range, with low-end models—such as handwriting trainers for children—at \$100.

A broad range of user-specific PDAs will be available: a dictation PDA that translates speech into text; a wireless E-mail device for executives; a PDA that recognizes mathematical formulas and assists with calculations for engineers and students; a wirelessly communicating order-entry and customer follow-up tool for sales professionals.

PDAs will support countless PCMCIA wireless-communication options such as cellular, paging and wireless E-mail. In close quarters such as classrooms and conference rooms, spontaneous peer-to-peer local networking may bring a whole new protocol to business-card and personal-information exchange. By 2005, PDAs will have sub-

stantially replaced paper in business- and personal-information management, note taking and forms applications.

But that's the future.

Back to Reality

THE HERE AND NOW

The most visible players in the PDA world to date have been Apple Computer and AT&T. Apple coined the term "personal digital assistant" to categorize its handheld, pen-based Newton. AT&T followed with the term "personal communicator" to classify its communication-centric handheld product, the EO. Apple responded by adding a communications footnote to its vision, and it became clear that, in spite of their names, PDAs and personal communicators would compete for the same customers. PDA will be the moniker of choice, since personal communicator is too long for us productivity-centric folks—and PC is already taken.

Although Apple's Newton is far from dead, it has certainly been a disappointment. Spawned from a grandiose vision of a breakthrough, user-friendly electronic assistant, when it actually arrived the Newton

was so highly criticized in the press that Apple now insists on a full day of Newton training, even for knowledgeable computer columnists. What could speak more loudly about its non-ease of use?

Not quite a communicator, not large enough for good note taking and with handwriting-recognition deficiencies, the Newton just couldn't live up to its advance billing. But don't trash it yet. Remember the Apple Lisa? A laughingstock on first deliv-

ery, Lisa grew up to become Macintosh and inspired Windows. With the Newton, even if the first implementation is poor, Apple has a strategic plan to be the architecture franchiser of Newton hardware and software. And it is building an impressive list of Newton licensees, including Sharp.

When AT&T first introduced the EO, it was large and expensive relative to the PDA and personal-communicator vision. With its \$2,000 entry price, it competed only as a tablet pen computer in vertical-market applications. The EO personal communicator is based on GO's PenPoint notebook-metaphor operating system.

Recently, AT&T folded GO into its EO unit and made a quiet announcement that it was laying off 50 percent of its workforce and repositioning its EO product as a cellular-phone-plus, with the first product expected late in 1994. This move marked the silent death of GO's much-praised PenPoint operating system, although we may see future AT&T personal communicators with PenPoint.

By 2005, wirelessly communicating PDAs more powerful than today's desktop PCs will cost less than \$800.

On the Horizon

INNOVATION MARCHES ON

While Apple and AT&T were struggling to get their products right, Tandy (the Zoomer) and Casio (the Z-7000) joined the PDA brawl with elegant, low-cost entries. Casio's Z-7000, for instance, costs about \$900. Based on GeoWorks' GEOS operating system (Sharp, Canon and AST Research have also com-

In 1993, 80,000 PDAs were sold to end users.



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mitted to GEOS-based products) and Palm Computing's handwriting recognition and applications, it is packed with a number of goodies: Pocket Quicken for on-the-go check writing and cash management, calculator, dictionary, spelling checker, translation dictionary for 26 languages, world time clock, forms calculator, U.S. holidays, area codes and signs of the zodiac. It even contains the U.S. Declaration of Independence and the Constitution. It is highly compatible with desktop applications, since the Z-7000 application can run on Windows.

Application-development tools for the Z-7000 are near relatives to Windows tools, so corporations developing specialized applications for it will experience a rapid learning curve. The Z-7000 and the Tandy Zoomer are today's most complete PDAs. No hype, no razzle-dazzle. Just elegant, useful, remarkable information power in a slick consumer package. It's a terrific beginning.

Where there is communication, you can expect Motorola. Its Envoy, which Motorola says will be available this summer, will include both a wired data-fax send/receive modem and an ARDIS wireless data-packet modem in its base price of about \$1,500. Envoy also features RadioMail and AT&T PersonaLink client applications, and customers are encouraged (like cellular-phone buyers) to sign up for one of the associated services when they purchase Envoy. Wireless E-mail alone will be a sufficient draw for many consumers, although a host of

Maybe the winning PDA won't be a PDA at all but rather a sub-notebook.

other applications, including PenWare's PenCell spreadsheet and Intuit's Quicken, are available.

Based on General Magic's Magic Cap platform and Telescript technology, Envoy features a touch screen,

voice notes, an on-screen touch keyboard and a pen for electronic-ink drawings and handwritten notes (but no handwriting recognition). (Sharp, Sony and Nippon Telegraph and

Telephone have also announced support of Magic Cap.)

Although no announcements have been made, we can expect to see Compaq Computer and Microsoft come to market later this year with the WinPad PDA. Its strength will be its similarity to Windows systems

in both user interfaces and application program interfaces. WinPad will inherit applications software, distribution channels and scores of computer manufacturers from the Windows industry.

The \$64,000 Question

WHO WILL PREVAIL?

When you count the contending microprocessor/OS platforms (AT&T's Hobbit/PenPoint, Apple's ARM/Newton, GeoWorks' X86/GEOS, General Magic's 68349/Magic Cap, and Microsoft's X86/WinPad and X86/Windows), you realize that there are more PDA platforms than desktop platforms. Why so many? Can they all succeed? And if not, which will prevail?

That depends partly on our perception of what a

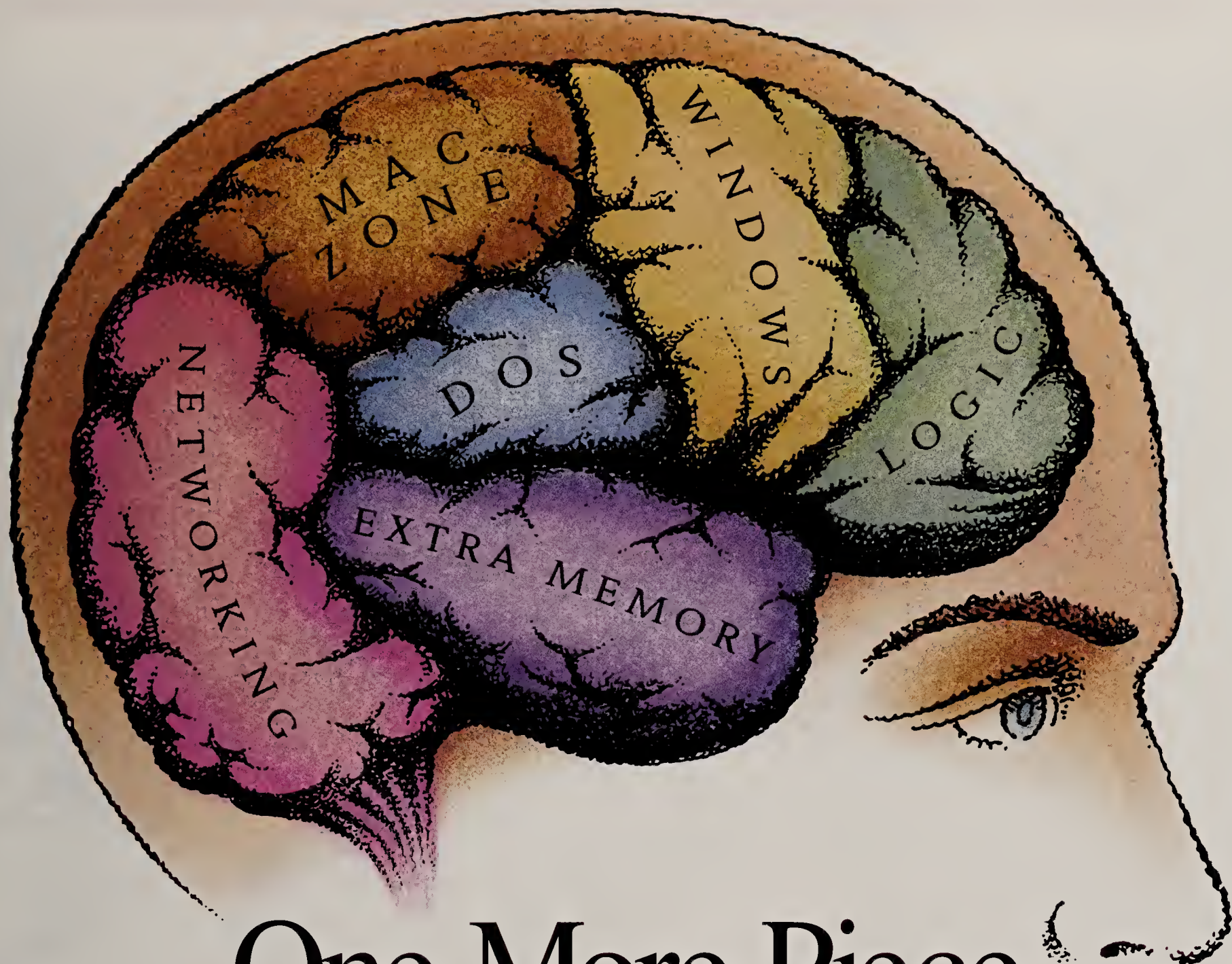
PDA is and will become. Should it be mostly for communication? Note taking? Must PDAs compete with PCs in such applications as spreadsheets? Is it for people who don't use a PC, or should it be a PC companion? If a PDA is used primarily like a telephone and is for people who do not use a PC, then it could be based on a new platform (e.g., Hobbit/PenPoint, ARM/Newton, 68349/Magic Cap). If a PDA must do spreadsheets and is to be used primarily by people who use PCs daily, then users will want it to be based on computing platforms (e.g., X86/GEOS, X86/WinPad).

I doubt that all of today's six competing platforms will survive. Each contender has powerful partners and a rationale for being. However, the forces in the PC, consumer electronics and communications markets for standards are so powerful that eventually (by 2005) I expect three (or fewer) survivors, with one having a strongly dominant market share (80 percent).

For a dramatically new technology, PDAs are right on track. New technologies always take more time to become really useful and widely accepted than we expect. If PDAs continue to emerge at their current rate of growth in innovation and customer awareness, 1997 will be the year of the PDA boom. **CIO**

Portia Isaacson is president of Dream IT Inc., a consultancy and publisher headquartered in Colorado Springs, Colo., dedicated to providing quality business information to customers and creators of frontline IT.





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Neural Net Gains

From multinational corporations to off-track betting parlors, neural networks are alive and thinking

BY TRACY MAYOR

Imagine a set of algorithms that allows software to mimic the workings of the human brain. Sound interesting? Sure. But would you pitch the idea in your next senior-management meeting?

Neural networks—computer systems that approximate the way the brain learns and stores data by assigning simple tasks to multiple processors simultaneously—burst into view several years back. But after the initial publicity fireworks died down, these systems disappeared from many business radars. It was one thing to build a software system capable of adaptive pattern recognition and identifying nonlinear relationships in a computer lab, but it was quite another to put this power to immediate use in a competitive business environment.

But for some companies, neural networks never went away; they just went underground. When incorporated into a company's established systems, neural nets can goose performance by one or two crucial percentage points, reduce errors, en-

hance efficiency, forecast results, filter large amounts of data and dramatically decrease the time it takes to build new business models.

"In five years, you'll be behind the eight ball if you're not fluent in this technology," says Craig C. Smith, marketing database manager at People's Bank of Bridgeport, Conn. Smith has developed a direct-marketing neural-net model using Advanced Software Applications (ASA) Corp.'s ModelMAX. "On the front end, we'll be able to cut back on the number of pieces we mail. We'll get the same number of new accounts with fewer pieces." On the back end, neural-network models help Smith to more accurately identify existing customers who are likely to sign up for new services as well as those who are likely to take their business elsewhere. The neural network allows "a lot more segmentation techniques and profiling," he says. "We can include things like the volume of checks people clear each month and their balance levels" as variables in the models.

The case for neural networks wasn't particularly helped by earlier coverage, which overemphasized the analogy between the human brain and simulated neural networks. "How are you going to sell a brain to your average CIO?" asks Ken Kleinberg, director of applied intelligence systems at New Science Associates Inc., a Gartner Group company in Westport, Conn. "It's best not to think of them in terms of the brain at all."

A conventional computer program takes information in very small chunks and performs various processing chores on those chunks—such as adding numbers together or switching around the position of words. A neural network, on the other hand, takes a complete pattern—an image, a set of sounds, a list of characteristics—and



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tries to categorize, or recognize, the entire pattern simultaneously, explains David H. Freedman, a *CIO* contributing writer and author of *Brain-makers* (Simon & Schuster, 1994), which covers biological approaches to artificial intelligence.

When people refer to neural networks, they're referring to an artificial implementation in either software or hardware, or both, that attempts to imitate the brain's natural pattern-recognition prowess. Through repetitive training—"showing" the network myriad examples of desirable and undesirable data—neural nets learn to recognize patterns in nonlinear data.

"A neural net is simply a means of approximating a nonlinear relationship in software," agrees Jean-Jacques E. Slotine, professor of mechanical engineering and information sciences at MIT in Cambridge, Mass.

Because neural networks can apply what they've learned to unfamiliar situations, and because they are particularly well-suited to "needle in the haystack" scenarios—finding patterns in noisy data, predicting outcomes and clustering data according to multiple variables—they've been successful in areas such as process control, marketing, fraud detection, financial analysis, and recognizing speech, handwriting and characters.

Hospitals use neural nets to predict how long a patient with a given set of symptoms is likely to remain hospitalized; financial analysts use them to ferret out nascent trends in the stock market weeks before they become obvious to human observers; manufacturing plants use them to monitor machinery, where they expertly screen out insignificant noise but identify potential breakdown conditions before they become serious.

This year, Visa will begin using neural nets to reduce the multimillion-dollar annual burden of fraud for its 20,000 card-issuing member institutions. The credit giant is in the process of developing two separate neural-net systems. One, which identifies card-holder risk, has been in pilot mode since last August and is expected to go live in the third quarter, says Cathy Basch, senior vice president of risk management and information services for Visa in San

Firms at the Forefront	
<i>As many as 400 vendors sell software and hardware that incorporates neural-network technology to some degree. Experts and key players, however, generally cite these six vendors as being at the forefront of the marketplace.</i>	
COMPANY & LOCATION	PRODUCTS
Adaptive Solutions Inc. Beaverton, Ore. 503 690-1236	Markets CNAPS, a high-end development architecture for companies that want to develop and resell their own neural-net applications. Pricing is \$34,950 for the massively parallel CNAPS Server II processing computer, \$4,500 for the CNAPS development software.
Advanced Software Applications (ASA) Corp. Pittsburgh 412 227-5300	Currently offers ModelMAX, a \$25,000 predictive modeling application for direct marketers, and DBProfile, new clustering software for database analysis priced between \$8,000 and \$10,000. A financial-fraud application is due by early summer. Also produces custom applications.
California Scientific Software Nevada City, Calif. 916 478-9040	Offers BrainMaker Standard (\$195) and BrainMaker Professional (\$795), entry-level simulation packages that some managers use as a way to familiarize themselves with the basic concepts of neural networks. Both run under DOS or Windows; BrainMaker Standard is available for the Macintosh as well.
HNC Inc. San Diego 619 546-8877	Offers a high-end line of client/server applications, including the Falcon credit-card fraud-detection system (prices range from \$500,000 to \$2 million for a five- to seven-year contract). Also sells the DataBase Mining Workstation, an \$80,000 software system that allows users to "mine" their databases and develop neural networks on their own.
Nestor Inc. Providence, R.I. 401 331-9640	With Intel Corp., co-developed the Ni1000 neural-network chip, which incorporates some 3 million transistors to support massively parallel processing. Markets the Fraud Detection System application (prices range from about \$200,000 to \$600,000) and a series of character-recognition products.
NeuralWare Inc. Pittsburgh 412 787-8222	Offers the widely used NeuralWorks neural-network development system and is at work on a forthcoming process-control application called NeuCop. Prices for the NeuralWorks Complete System range from \$3,995 to \$7,995, depending on the hardware platform.

Francisco. The other, being developed jointly with high-end neural-net provider HNC Inc. of San Diego, identifies risky merchants or those that attract a lot of risky transactions. This system should be online by the first quarter of next year.

To minimize fraud losses and ulti-

mately shut down a fraudulent card, Visa must be as close to the bad transactions as possible. "A neural net is constantly watching patterns and training itself, so it's more dynamic than a statistical model and can react faster to changing fraud patterns," Basch explains. In tests, the

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T H E T E C H N O L O G Y S E R V I C E S C O M P A N Y

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Many companies won't need to invest in specialized hardware to reap the benefits of neural nets, according to James Wesolowski, assistant director of the Washington-based International Neural Network Society. Neural-net chips from companies such as IBM Corp. and Hitachi America Ltd. or specialized neural-net servers from HNC and other firms are necessary only when analyzing large amounts of data in a real-time environment, he and others agree.

—Cathy Basch

“You still need to know your data very well for the neural network to work,” Fink warns. “You need to know something about the process that generated the data and what it means in a business context so that you don’t have ridiculous factors being added in.”

Similarly, Fink recommends that businesses look for “pieces of the problem that lend themselves to neural nets. One part could be pattern matching; other parts could have hard and fast rules,” he says.

Depending upon whom you talk

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to, neural networks are either naturally compatible with or natural competitors of statistical modeling. On the one hand, many observers recommend that companies turn to neural networks specifically for cases where traditional statistical modeling has failed to produce the desired results. At the same time, corporations such as Visa are using neural networks to enhance results reached by a statistical model. The 1 or 2 percent performance improvement added by Visa's neural net can translate into thousands of dollars in large applications.

John Popowski, marketing manager at Plow & Hearth, a consumer catalog company in Orange, Va., says that a statistics model and a neural-net model performed at the same pace on his direct-market catalog database—the difference was in front-end labor. Before experimenting with ASA's ModelMAX, Popowski's department had to turn to an outside consultant to develop a new model. Once the depart-

ment decided to bring the software in-house, redevelopment of the model took two or more weeks. But since Plow & Hearth brought in ModelMAX, he says, the staff can build and train a model overnight if necessary.

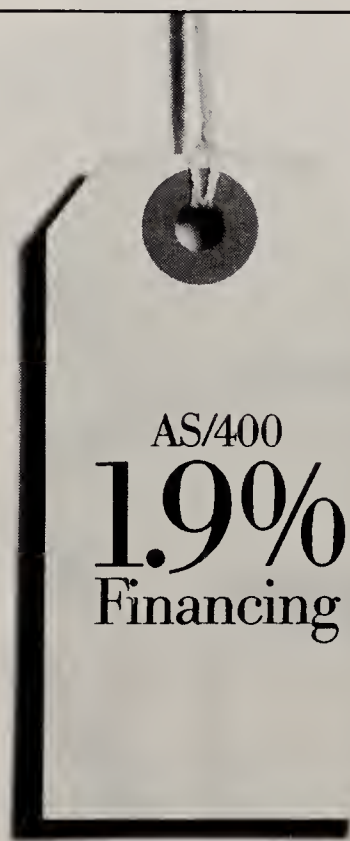
Managers thinking of exploring the neural-net market have several options. More than a few market players suggest that companies first buy a low-end package, such as California Scientific Software's \$195 BrainMaker, to familiarize themselves with the underlying concepts before investing any serious money. Others recommend sending a few key employees to courses, such as those offered by NeuralWare.

It's uncommon for a company to develop a neural network from scratch entirely on its own, though it is possible, providing it has a neural expert on staff or is willing to train or hire one. More often, companies invest in a neural-net development system, such as those offered by Adaptive Solutions

Inc., HNC and NeuralWare.

Companies such as ASA and NeuralWare now offer complete neural-net modeling packages tailored for such operations as direct marketing and financial-fraud detection. These packages can save hours of development and training time, according to users such as People's Bank's Smith and Plow & Hearth's Popowski. Even so, potential buyers should keep in mind that these packages still need plenty of TLC, particularly at the outset, in order to attain specific business goals. "Neural networks have to be trained to exactly what you're trying to achieve," says Tod Loofbourrow, president and CEO of Foundation Technologies Inc., a Cambridge, Mass., consultancy specializing in knowledge-based systems. "Make sure any off-the-shelf applications are trained with the same goals that you have for the business." 

Tracy Mayor is a freelance writer and editor based in Salem, Mass.



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A \$7,900 Unix version can be used on Sun Microsystems Inc. Sparc (or compatible), Hewlett-Packard Co. and Windows NT units. The Windows 3.1 version is available for 386 and 486 platforms for \$4,900. Call 719 598-4299.



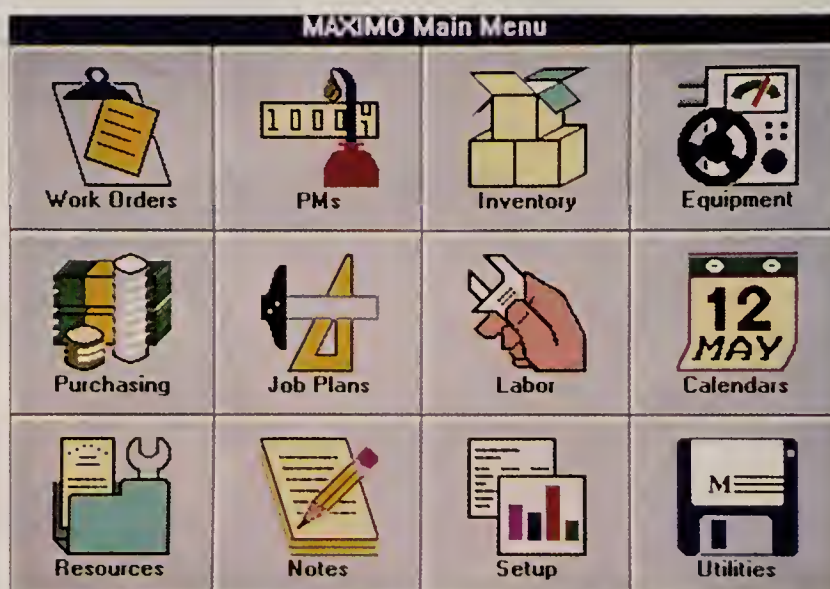
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Maximo is made up of 12 interconnected modules tied to a structured query language database. Modules address various aspects of an organization, including work-order management, planning and scheduling, asset management, purchasing, resource management, and reports and analysis. The Windows-based system features a graphical user interface and such standard conventions as toolbars and screen resizing and tiling. It also has an industry-standard editing kit for user customization.

Maximo Series 5 runs on DOS, OS/2, NLM and Unix platforms. Supported local area networks (LANs) include NetWare, Vines, LAN Manager and LAN Server for OS/2. LAN pricing, which includes five clients, starts at \$39,800. For further information, call PSDI at 617 661-1444.



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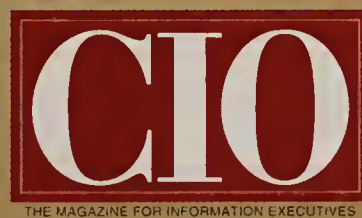
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Trident Hospital wanted a quicker way of transferring radiological images.



A FASTER SET OF WHEELS WASN'T IN THE PLAN.

Finding a systems integrator with real-world experience in image management and complex system design *was* in the plan.

The search brought Trident to a partnership with Martin Marietta to realize their vision of transmitting patient images real time to multiple locations. Prior to the new system, images were transferred using a courier or they were transmitted over low-speed phone lines. With the new integrated system, images that took over an hour to reach their destination now take seconds to arrive - the time it takes to warm up an engine.

To help Trident meet its goal, Martin Marietta drew on more than 25 years of systems integration experience and provided the information technology expertise required to identify, develop, and deploy this strategic initiative. Working closely with GE Medical Systems and BellSouth, Martin Marietta developed a detailed design, implementation, and test plan for the first phase of Trident's radiology network.

In less than 5 hours, on the evening of September 13th, 1993, this team had completed the integration and test of the newly networked system. At 8:00 AM on September 14, 1993, hospital technicians began transmitting the first image using the new system. Within seconds the image was available for viewing at a remote site.

MARTIN MARIETTA

Management and Data Systems, 640 Freedom Business Center
King of Prussia, PA 19406, Phone 1-800-213-0582

A Texas Loan Star

Texas Commerce Bancshares transformed its poky loan-approval process into an industry model

A few years ago, when the state of Texas changed its laws to allow banks to open branches statewide—rather than requiring each institution to operate as a separate entity—officials at Houston-based Texas Commerce Bancshares (TCB) Inc. sensed a 10-gallon opportunity.

Before the switch, individual TCB banks scattered across the state conducted their own consumer-lending activities, including auto loans, unsecured loans and credit on demand. Each processed applications, made credit decisions and collected unpaid loans. And each had a different way of handling the process. The setup was expensive, labor-intensive, dependent on paper files and riddled with duplication and delays, says Allen Courner, TCB senior vice president.

TCB sought a business-technology solution that would allow it to generate a larger volume of consumer loans at a lower cost. In late 1990, it consolidated all consumer lending statewide at a new facility in Houston, supported by a state-of-the-art electronic workflow system from ViewStar Corp.

TCB knew the rest of the industry would be watching. The company is a major player, with \$200 million in after-tax earnings in 1993 and 9,500 employees in 120 locations. And it is performing on a major stage: Texas has 1,100 banks, more than any other state, and the average household maintains multiple accounts. Competition for con-

sumer lending is high; profit margins are thin.

Under the old method, a customer visited a bank, filled out a credit application, then waited to see a loan agent. Many banks had only one or two loan officers, so the applicant could face a long wait in the lobby. After the officer and customer met face to face, the application passed to a clerk for a credit check by phone, a process requiring at least 20 minutes. Later, the clerk returned the file to the officer, who analyzed the data, decided whether to grant the loan, called the customer and prepared documents. Typically, the paper-intensive workflow took up to a full day.

Since April 1991, the entire process has been online, with the customer's electronic file passed automatically to the next available employee at every stage. Local banks fax the application directly into the Houston loan system, from which a clerk shoots off an electronic credit inquiry to a New York credit service. The data bounces back in less than 30 seconds.

Then the electronic file moves to a loan officer in Houston for the final decision. If it's thumbs up, a keystroke generates the documents and faxes them to the branch for the customer to sign. If not, the file returns to the branch electronically, where local officials notify the customer. The system also generates a letter explaining the rejection.

In planning the center, TCB envi-

sioned a three-hour turnaround time. In practice, Courner says, the process takes 90 minutes about 90 percent of the time. Loan volume has tripled, and department staffing was cut 50 percent statewide, Courner says. The 300 to 400 affected employees were given new jobs or offered transfers to other locations.

Other departments, such as trust and collections, can also use the system to access customer files. And officials have scanned 2.5 million signature cards into a central record base in Houston; TCB tellers anywhere in Texas can contact the loan center and get a faxed copy of a signature in seconds.

The new system also facilitates growth by letting the center link up quickly with new divisions, such as the 40 First City banks TCB bought in 1993. "All we had to do at any of the First City banks we acquired was add a fax machine and a laser printer and we were in business," Courner says.

Finally, the experiment has raised the company's profile, turning it, in Courner's words, from a follower in the industry into a leading-edge player. He and his colleagues regularly host visitors from banks beyond the Lone Star State who are curious about the system.

—Anne Stuart

VITAL STATISTICS

Organization: Texas Commerce Bancshares Inc., Houston

Application: Central loan-application facility

Sponsor: Allen Courner, senior vice president

Technologies: Novell LAN-based system with 486SX workstations equipped with ViewStar Corp. electronic workflow and imaging software

Scope: 435 loan-center employees; more than 100 branches statewide

Objective: To consolidate consumer-lending activities, generating more loans at lower cost

Payoff: Loan volume tripled; staffing cut 50 percent statewide

Value Added: System used for other purposes; new branches easily brought online; bank officials frequently serve as consultants

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The IT department for Collin County, Texas couldn't agree more. With just a handful of staff members, they had to service a county that was

growing fast. Rather than subject this influx of callers to busy signals and long hold-times, their IT department

chose to install a ROLM phone system. Now they can easily handle the increase in incoming calls and transmit data through those same lines.

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PC SOFTWARE
BRAND
PREFERENCE

DOS-Based
CASE

AMONG TOTAL RESPONDENTS
Question: Which brands of DOS-based
CASE software are currently installed in
your organization?

INSTALLED IN COMPANY	EASY TO USE	BEST TECHNOLOGY	BEST PRICE/ PERFORMANCE
KnowledgeWare, Inc. (Information Engineering Workbench) 42%	Micro Focus (Workbench) 38%	Micro Focus (Workbench) 29%	Micro Focus (Workbench) 30%
Micro Focus (Workbench) 40%	KnowledgeWare, Inc. (Information Engineering Workbench) 17%	Texas Instruments (Information Engineering Facility (IEF)) 26%	KnowledgeWare, Inc. (Information Engineering Workbench) 14%
Intersolv (Excelerator) 15%	Intersolv (Excelerator) 9%	KnowledgeWare, Inc. (Information Engineering Workbench) 24%	Intersolv (Excelerator) 11%
Texas Instruments (Information Engineering Facility (IEF)) 13%	Computer Associates (CA-Realia) 8%	Computer Associates (CA-Realia) 5%	Texas Instruments (Information Engineering Facility (IEF)) 11%
Computer Associates (CA-Telon) 7%	Visible Systems Corp. (Visible Analyst Workbench) 8%	Cadre Technologies, Inc. (Teamwork) 3%	Computer Associates (CA-Realia) 5%
Computer Associates (CA-Realia) 6%	Texas Instruments (Information Engineering Facility (IEF)) 4%	Intersolv (Excelerator) 3%	Visible Systems Corp. (Visible Analyst Workbench) 5%
Intersolv (VSDesigner) 3%	Cadre Technologies, Inc. (Teamwork) 2%	Computer Associates (CA-Telon) 2%	Cadre Technologies, Inc. (Teamwork) 1%
Sybase		Sybase	

Question: For each of the DOS-based CASE software listed, please indicate which
company you most closely associate with each characteristic:

- Easy to use
- Best service/support
- Best technology
- Best documentation
- Best price/performance
- Prefer to do business with

Question: Which brands of DOS-based
CASE software are likely to be purchased
during the next 12 months?

BEST SERVICE/ SUPPORT	BEST DOCUMENTATION	PREFER TO DO BUSINESS WITH	PLAN TO BUY
KnowledgeWare, Inc. (Information Engineering Workbench) 26%	Micro Focus (Workbench) 34%	Micro Focus (Workbench) 28%	Micro Focus (Workbench) 50%
Micro Focus (Workbench) 26%	KnowledgeWare, Inc. (Information Engineering Workbench) 31%	KnowledgeWare, Inc. (Information Engineering Workbench) 23%	KnowledgeWare, Inc. (Information Engineering Workbench) 29%
Texas Instruments (Information Engineering Facility (IEF)) 19%	Intersolv (Excelerator) 10%	Texas Instruments (Information Engineering Facility (IEF)) 19%	Texas Instruments (Information Engineering Facility (IEF)) 16%
Intersolv (Excelerator) 10%	Texas Instruments (Information Engineering Facility (IEF)) 7%	Intersolv (Excelerator) 6%	Intersolv (Excelerator) 5%
Cadre Technologies, Inc. (Teamwork) 3%	Computer Associates (CA-Realia) 3%	Computer Associates (CA-Realia) 4%	Cadre Technologies, Inc. (Teamwork) 3%
Computer Associates (CA-Realia) 3%	Sybase	Computer Associates	Computer Associates



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Not surprising really. There is no better technology for developing new systems or re-engineering existing applications

on the workstation. Programmers find Workbench puts them directly in control of their development environment, delivering quality business applications on time and on budget.

If it isn't Micro Focus COBOL Workbench, it isn't in the running. That's not just our opinion, it's yours.

For your free copy of the 1993 Computerworld survey, or for more information, call 800-MF-COBOL, (800-872-6265).



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